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COVER PHOTOS

Front Cover

- | | | |
|----|--|-------------------|
| 1. | White Tiger (<i>Panthera tigris</i>) | Dr. Dushyant Gaur |
|----|--|-------------------|

Front Cover (Inner)

- | | | |
|----|---|--------------------|
| 1. | Albino Cheetal (<i>Axis axis</i>) | Dr. Yaseer Rafique |
| 2. | Albino Cheetal (<i>Axis axis</i>) with normal Cheetal | Dr. Yaseer Rafique |

Last Cover (Inner)

- | | | |
|----|--|-------------------------|
| 1. | Swans (<i>Cinnyris asiaticus</i>) | Dr. Dushyant Singh Gaur |
| 2. | Spoonbill (<i>Pelecanus crispus</i>) | Dr. Dushyant Singh Gaur |

Last Cover (Outer)

- | | | |
|----|--|-------------------|
| 1. | Royal Bengal Tiger (<i>Panthera tigris tigris</i>) | Karan Singh Kotla |
| 2. | Royal Bengal Tiger (<i>Panthera tigris tigris</i>) | Karan Singh Kotla |

Disclaimer

'Cheetal' - started in 1959, is the Official Journal published by Wildlife Preservation Society. The journal is intended as a medium for communication and discussion of important issues that concern wildlife and environmental activity.

All articles published in 'Cheetal', including editorials, articles, research papers, observations and commentaries, letters to editor and book reviews are deemed to reflect the individual views of authors and not the official points of view of editors and executive members of the society. All articles have been edited by the authors and the details in the 'About the author' section have been given by the authors.

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The contributing authors are solely responsible for the accuracy of scientific contents particularly the scientific names of the species and statistical data mentioned in their articles. Authors are requested to send photographs related to the article and research papers (Example - If you are describing the findings related with fish or other animal, the photographs (colour) of that particular fish or animals. The location map or Special sight (Lake, River, Pond, Field etc.) must be given in the writeup.

EDITORIAL

White is the colour of wisdom, purity and perfection. An amalgamation of all colours. The 'white tiger' captured in the lens by Dr Dushyant Singh Gaur with its deep blue eyes comes as a contrast to the black panther on the cover of previous issue of Cheetal. This photo is complemented by an article on 'Mohan' by Nilin Kumar Dubey of Rewa. The inner cover page showcases Albino Cheetal from Ahmedabad Zoo taken by a dear friend and dentist Dr Yaseer Rafique. The pair of swans and spoon bill on the back inner cover complete the white theme. The spectacular snaps of tigers on the back cover page by Karan Singh do adequate justice to the beauty and magnificence of our National Animal.

First and foremost I would like to thank our Patron Mr Ravi Singh and our senior members Padamshree Dr Ranjit Bhargava and Dr S Farooq for appreciating the January-April issue of Cheetal. It is messages from our senior and respected members which motivates us to do better under the able leadership of our President Rashmi Kant Shukla IFS(R), Former Principle Chief Conservator of Forests, Uttar Pradesh.

This issue of Cheetal contains articles from two very senior forest officers Sudhir Ahluwalia and B. K. Singh. There are articles from Madhya Pradesh, West Bengal, Uttar Pradesh, Bihar, Uttarakhand, Rajasthan. An overseas article from Tanzania, Africa contributed by Prakash Gariya. Rajiv Mathew's article takes us on a poetic journey through the jungles of Central India while Colonel Gaurav Kamboj shares his first encounter with the Great Indian Bustard.

In an attempt to further improve the quality of the journal, the Editorial Board has undergone expansion. This decision was taken in one of the Executive Body meetings. Our President Rashmi Kant Shukla will head the Editorial Board. Dr Sangeeta Khare will assist with the scientific articles. Members and authors are humbly requested to send original articles/scientific papers on real life field experiences with all aspects of wildlife management, preservation, conservation, breeding, rehabilitation, their habitat biodiversity etc.. Articles/ Photos which are 'copy pasted' from the net will not be entertained.

Of late, a few members have shown resentment regarding articles on hunting. In a meeting held on 25th July 2017 (Jim Corbett's birth anniversary) a detailed discussion on the subject took place. I would like to explain that the Society stands against any form of poaching. Never the less it is very much required to be made clear that a decision of elimination of problem wild animals is vested with the Chief Wild Life Warden of the respective state in accordance with the provisions provided in the Wildlife (Protection) Act, 1972 (amended upto 2013). Culling of animals are an integral part of 'wildlife management' abroad in several countries as well. The article by Rahul Shukla on 'Gola Maneater' makes very interesting reading. Rahul Shukla has spent a lifetime studying 'sugarcane tiger'. Another beautifully written article by Prakash Singh on wild buffaloes is in no way to glorify 'Trophy Hunting'. The photos attached from an era gone by (when hunting was legal in India) are to give an insight into this powerful animal which once roamed the Diara grasslands of Kosi river. The massive size of trophies are probably a gene pool lost forever not only due to hunting but also due to habitat loss.

I hope members will enjoy going through this May-August issue of Cheetal. The Editorial Board is open to suggestions and contributions of articles from our esteemed members.

Dr Prashant Singh
Executive Vice President

OBITUARY



In everlasting memory of Kunwar Yashwant Singh Bhinai. Born on 20th March 1979 in the erstwhile Royal family of Bhinai Ajmer. Yashwant had a keen interest in wildlife and nature from an early age. He was a fifth generation Mayoite. An accomplished horse rider, keen Show Jumper and Polo player. Yashwant's love for the outdoors was unmatched. He had worked as a head naturalist with Singinawa Jungle Lodge, Kanha National Park, Madhya Pradesh from 2007 to 2012. Presently he was looking after his Palace Resort and lead Wildlife Tours to Sikkim, West Bengal and Bhutan. Yashwant had won the hearts of many of our members. In December 2017 he had visited Corbett with our members

Mansoor Mazhar, Zaheer Bakshi, Chetanya Singh and Prashant Singh. "I have not come to see the tiger. I have come to see the jungle." He had told our guide as we entered Corbett through the Dhangari Gate. Sure enough the tiger made an appearance on the second day of our trip. A keen photographer, he contributed an article on Lesser Florican (*Sypheotides indicus*) in Cheetal Vol 54 No. 2 (2017). The bird is endangered and Yashwant was contributing his bit to save the species in his own small way. He passed away very young on 15th June 2018 due to a massive heart attack. His friend and associate Karan Singh Kotla who worked with him in Bandavgarh has dedicated two spectacular photographs for the cover (back) page. A large hearted gentleman, Yashwant will always be missed.

Over the years we have lost five of our senior members

1. Maharaj Kanwar Gajbir Singh of Jindh
2. Group Captain Ranvijay Singh of Dumraon House
3. Shri A S Bindra
4. Shri Sandeep Singh Bajwa
5. Shri R. S. Bisht

Heartfelt condolences from all members of the Wildlife Preservation Society. These Members had contributed immensely in their own special way. Their passing away is a great loss to the Society.

May God grant their soul eternal peace.

रीवा का गौरव—सफेद बाघ मोहन

नलिन कुमार दुबे

e-mail :

प्रस्तावना

वन प्राणियों में अत्यंत गौरवशाली और आकर्षक जीव है— सफेद बाघ। प्रकृति की इस अद्भुत देन को विश्व के समक्ष प्रस्तुत करने का गौरव मिला है रीवा राज्य के जंगलों को। विपुल वैभवशाली बांधव वसुंधरा में अनेक उत्कृष्ट धरोहरों में से एक है—दुर्लभ “सफेद बाघ”। संसार के समक्ष सबसे पहले रीवा राज्य की बांधवीय वसुंधरा ने “सफेद बाघ” प्रस्तुत किया। “सफेद बाघ” प्रकृति का विश्व को दुर्लभ एवं अनुपम उपहार है और विश्व को यह उपहार भेंट करने का गौरव मिला है — रीवा राज्य के महाराजा मार्तण्ड सिंह जू देव को। आज विश्व के वन्यजीव प्रेमी महाराजा रीवा द्वारा सफेद बाघों के संरक्षण एवं संवर्धन के लिए किये गए प्रयासों के प्रति कृतज्ञ है।



Maharaja Martand Singh

रीवा राज्य के महाराजा अपने अतिथियों को मनोरंजन के लिए शिकार के आयोजनों की व्यवस्था किया करते थे। इन शिकार के विस्तृत व्यौरों को क्रमबद्ध रूप से रखने की जिम्मेदारी महाराजा के निजी मोहकमा खासगी के अन्तर्गत उप मोहकमा शिकारगाह की होती थी। शिकारगाह का एक प्रमुख अधिकारी होता था जो शिकार से संबंधित समस्त गतिविधियों के लिए उत्तरदायी होता था। शिकारगाह मोहकमे

का एकमात्र कार्य जंगली जानवरों—विशेषकर बाघों का पता ठिकाना रखकर आवश्यकतानुसार समय—समय पर हांका करवाना, और शिकार के आयोजनों की व्यवस्था करना होता था। यही शिकारगाह मोहकमा राज्य में मारे गए बाघों के विवरण को क्रमबद्ध तरीके से लिपिबद्ध कर सुरक्षित किया करते थे। रीवा राज्य के शिकारगाह अफसर श्री सुरेन्द्र सिंह जी के अनुसार सन् 1901 से लेकर 1955 तक राज्य में लगभग 8 सफेद बाघों के मारे जाने, पकड़े जाने या देखे जाने की सूचनायें राज्य को प्राप्त हुई थी, जिनका विवरण शिकारगाह की डायरियों में दर्ज किया गया था।

रीवा राज्य में सफेद बाघ : ऐतिहासिक विवरण

ऐतिहासिक विवरणों के आधार पर यह कहा जा सकता है कि—रीवा राज्य और उसके आसपास के क्षेत्रों में सफेद बाघ की दुर्लभ प्रजाति मौजूद थी। कई शिकार आयोजनों के अवसर पर सफेद बाघ या तो मार दिए गए या पकड़ लिए गए। कई बार सफेद बाघों को देखे जाने की सूचनाएँ इलाकेदारों के द्वारा रीवा महाराजा को दी गई।

बीसवीं शताब्दी के शुरुआती वर्षों में लगभग 1902 से 1905 के मध्य सोहागपुर के इलाकेदार भैय्या बहादुर लाल सुखदेव बहादुर सिंह जी ने अनूपपुर से दक्षिण की ओर 10.12 कि.मी. की दूरी पर स्थित किरर जंगल में एक सफेद बाघ का शिकार किया था। यह शिकार एक सामान्य शिकार के आयोजन के समय हुआ था जिसमें अन्य जंगली जानवरों के शिकार के साथ एक सफेद बाघ भी मारा गया था। सोहागपुर के इलाकेदार भैय्या बहादुर लाल

सुखदेव बहादुर सिंह जी के साथ सोहागपुर के दीवान ठाकुर श्री माना सिंह जी तथा लगभग 10.12 शिकारियों के साथ शिकार के लिए गए थे जहाँ सफेद बाघ को मारने का अवसर प्राप्त हुआ।

सन् 1937 में रीवा महाराजा गुलाब सिंह जी ने एक सफेद बाघ का शिकार किया। उल्लेखनीय है कि महाराजा गुलाब सिंह जी ने राज्य में बाघों को मारने पर कड़ा प्रतिबंध लगाया हुआ था। राज्य के इलाकेदारों को भी बाघ का शिकार करने के लिए महाराजा रीवा से अनुमति लेना आवश्यक था।

सन् 1946 में रीवा राज्य के तत्कालीन प्रशासक अधिकारी मेजर एल.डब्ल्यू. उल्लिंज ने एक सफेद बाघिन का शिकार किया था। यह बाघिन गर्भवती थी। बाद में इसकी खाल को स्टफ कराकर सुरक्षित रखा गया।

सन् 1947 में रीवा महाराजा मार्तण्ड सिंह जी ने एक सफेद बाघ का शिकार किया। इस सफेद बाघ के शिकार के पश्चात् उन्होंने एक सफेद बाघ को जीवित पकड़ने का सपना संजोया।

कैद में पहला सफेद बाघ

दिसंबर 1915 में सोहागपुर इलाके में अनूपपुर के निकट भिल्लम डोंगरी जंगल में रीवा राज्य के युवराज गुलाब सिंह जी के द्वारा एक सफेद बाघ में जिंदा पकड़ा गया। यह सफेद बाघ दुनिया का प्रथम बाघ का जिसे जिंदा अवस्था में कैद किया गया था। यह बाघ पकड़े जाने के बाद लगभग पाँच वर्षों तक जीवित रहा और रीवा के वेंकट भवन के नजदीक कोठी बगीचे के चिड़ियाघर में सुरक्षित रहा। सन् 1920 में इसकी मृत्यु हो गई और उसकी खाल स्टफ कराकर राज्य की ओर से जार्ज पंचम को उपहार स्वरूप भेंट की गई। इस सफेद बाघ का विवरण "जर्नल आफ बाम्बे नेचुरल हिस्ट्री सोसाइटी" को तत्कालीन गृहसचिव पण्डित जानकी प्रसाद चतुर्वेदी के द्वारा प्रेषित किया गया था जो कि वर्ष 1921 में प्रकाशित हुआ। इस बाघ का संपूर्ण विवरण कैप्टन के. इवान्स गार्डन ने पुलिस अधिकारी मि. एच.ई.स्काट के द्वारा तैयार सूचनाओं के आधार पर प्रकाशित किया गया था।



First White Tiger Caught By Maharaja Gulab Singh Near Sohagpur

सफेद बाघों का पितामाह मोहन

मई 1951 में रीवा महाराजा मार्तण्ड सिंह जी के मामा जोधपुर महाराजा श्री अजीत सिंह जी अपने दो पुत्रों के साथ रीवा आए हुए थे। रीवा महाराजा ने मेहमानबाजी में शिकार का कार्यक्रम रखा था। सीधी जिले के गोपदबनास तहसील के ग्राम-देवा में कैम्प लगा हुआ था। कैम्प के आसपास के जंगलों में शिकार खेलने हेतु व्यवस्था की गई थी। कैम्प के पास ही लगभग 11 किमी. की दूरी पर पनखोरा गाँव के पास बरगड़ी के



Mohan

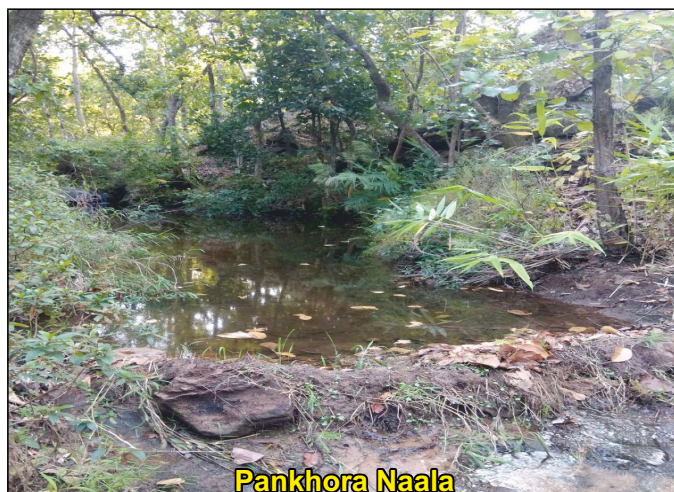


Pankhora Village

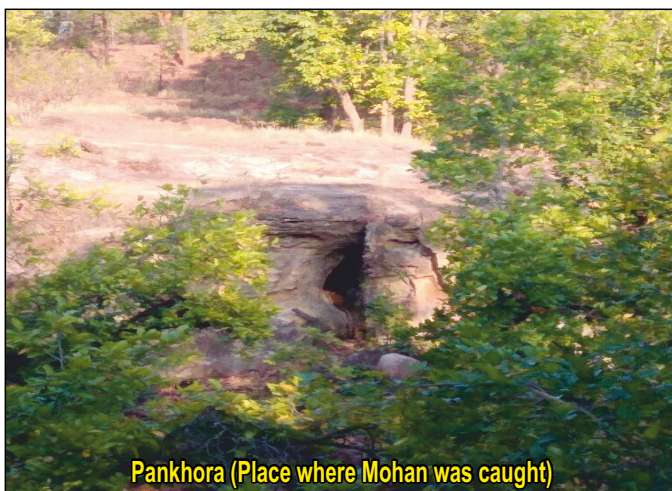
जंगल में 25 मई 1951 को दोपहर लगभग दो बजे रीवा महाराजा अपने मेहमानों के साथ पहुंचे। हांका प्रारंभ हुआ और लगभग एक घण्टे के इंतजार के पश्चात् एक बाघिन अपने चार शावकों के साथ मचान की तरफ आई। बाघिन को महाराजा जोधपुर ने अपना निशाना बनाया और तीन शावकों को जोधपुर के युवराजों ने। चौथा शावक जब सामने आया तो वह दूध के समान सफेद था। रीवा महाराजा ने तेज आवाज द्वारा उसे मारने से सभी को रोका तथा हांका बंद करने के निर्देश के साथ उसे जिंदा पकड़ने का आदेश दिया। शाम के लगभग छः बज गये थे और जंगल में विशाल दरख्तों के कारण अंधेरा हो चला था। शिकारियों ने कुछ देर तक सफेद शावक को तलाशा और

उसके न मिलने पर दूसरे दिन खोजने का कार्यक्रम बनाया। दूसरे दिन 26 मई सन् 1951 को दिन भर सफेद शावक की खोज की गई पर वह कहीं भी नहीं मिला। पंजों के निशान के आधार पर शिकारी उसकी खोज कर रहे थे। अंधेरा हो चला लेकिन उस दिन भी सफलता हाथ न लगी।

दिनांक 27 मई 1951 को सुबह के समय जब शिकारगाह अफसर श्री सुरेन्द्र सिंह जी और रीवा महाराजा के ए.डी.सी. श्री अहिमर्दन सिंह ताला के नेतृत्व में शिकारी शावक की खोज कर रहे थे, तभी एक नाले के किनारे पानी में सफेद शावक पड़ा हुआ दिखा। आवाज सुनकर वह नाले से छपाक की आवाज के साथ तेजी से भाग निकला और खरगोश की भांति उछलता हुआ नाले के किनारे की कन्दराओं के पास अदृश्य हो गया। शिकारियों ने पीछा किया पर वह कहीं नहीं दिखा। नाले के किनारे की चट्टानी खोह में उसके होने का अंदेशा हुआ तो मझले



Pankhora Naala



Pankhora (Place where Mohan was caught)

कुंवर साहब ताला श्री अहिमर्दन सिंह ने शिकारगाह अफसर सुरेन्द्र सिंह जी के कंधे में खड़े होकर उस खोह में झांका तो वहाँ अंधेरे में बाघ की आँखें लपलपाती हुई दिखीं। फिर क्या था, पहाड़ी खोह का मुंह लकड़ी-पत्थरों से बंद कर दिया गया और बांस का एक पिजड़ा बनाने की कार्यवाही प्रारम्भ हुई। शाम को लगभग चार बजे पिजड़ा बनकर तैयार हुआ। पिजड़े को खोह के मुंह पर बैठाया गया और बलपूर्वक शावक को निकालने का प्रयास किया गया। शावक भूखा-प्यासा था। पिंजड़े में मुर्गा और पानी रखा हुआ था। थोड़े प्रयास से ही सफेद शावक पिंजड़े में घुस गया और पिंजड़े का दरवाजा गिरा दिया गया। इस प्रकार विश्व का प्रसिद्ध सफेद बाघ मोहन रीवा महाराजा के पिंजड़े में कैद हो गया था।

राजमहल में “मोहन”

बरगड़ी के जंगल से पिंजड़े में कैद होकर सफेद शावक रीवा के गोविंदगढ़ महल में 27 मई 1951 को शाम सात बजे लाया गया जहाँ उसे ऐसे अहाते में छोड़ा गया, जो पहले रनिवास हुआ करता था। राजमहल में राजपरिवार के सदस्य उस समय निवास नहीं करते थे। बल्कि महाराजा रीवा गोविन्दगढ़ में तालाब से लगी हुई खखरी कोठी में निवास करते थे। जंगल का राजा बाघ अब इंसानों के राजमहल में आ गया था। पहली रात को ही वह राजमहल के आंगन की सीढ़ियों से चढ़कर दीवार फांद गया और राजमहल के दो प्रवेशद्वारों को पार करता हुआ मांद (मुकुंदपुर) के जंगल में पहुंच गया। सूचना मिलने पर शिकारगाह के अफसर मय शिकारियों के जंगल में पहुंचे और थके-हारे सफेद शावक को लाठी के प्रहार से घायल कर दिया और जाल फेंककर उसे पकड़



लिया गया लेकिन जाल फेंकने वाले शिकारी को शावक ने अपने पंजे और मुंह से घायल कर दिया। उसे पकड़कर वापस गोविंदगढ़ महल में लाया गया और उसको सुरक्षित रखने के लिए आवश्यक प्रबंध किए गए। जब उसे जंगल से पकड़ा गया था, तब वह लगभग 8.9 माह का शावक था। महाराजा रीवा ने उसके सौंदर्य को देखते हुए कहा—“यह तो मन को लुभाने वाला है” इसलिए इसका नाम “मोहन” रखा जाता है। महाराजा रीवा ने उसे बड़े लाड़-प्यार से उसका पालन-पोषण किया और विश्व में सफेद बाघों के संस्थापक पितामह के रूप में विश्व विख्यात हुआ।

“मोहन” की प्यारी “बेगम”

मोहन के लिए एक साथी की तलाश की जा रही थी। संयोग से इसी बीच रीवा महाराजा के पास सूचना आई कि एक बाघिन सुपिया-शिवपुरवा और टीकर के सीमावर्ती क्षेत्र में गड्डी पहाड़ से लगे हुए एक अहीर के जानवरों के सार (बाड़े) में घुसी हुई है। महाराजा रीवा ने शिकारगाह अफसर को आदेशित किया कि उस बाघिन को जिंदा पकड़कर लाया जाय और वह जब तक हिंसक न हो, तब तक उसे मारा न जाय। रीवा के शिकारियों के द्वारा उसे कैद करके गोविंदगढ़ महल लाया गया और उसका नाम रखा गया “बेगम”। यह बाघिन सामान्य रंग की थी।

मोहन और बेगम के संसर्ग से कुल 10 शावकों का जन्म हुआ। यह सभी शावक सामान्य रंग के थे। बेगम ने 7 सितंबर 1953 को अपने प्रथम प्रसव में दो नर शावकों को जन्म दिया जिनमें से एक शावक कलकत्ता के एनीमल डीलर को बेंच दिया गया और दूसरा बम्बई के चिड़ियाघर को बेंच दिया गया। 10 अप्रैल 1955 को बेगम ने दूसरे प्रसव में चार शावकों को जन्म दिया, जिसमें से दो नर एवं दो मादा शावक। इनमें से एक नर एवं एक मादा शावक को 16 अक्टूबर 1955 को कलकत्ता के एनीमल डीलर को बेंच दिया गया। एक नर शावक सैमसन को 13 नवंबर 1957 में अहमदाबाद चिड़ियाघर को बेंच दिया, जहाँ से वह 5 जनवरी 1963 को वासिंगटन जू चला गया। दूसरा मादा शावक “राधा” रीवा में ही रही और 20 जून 1964 में उसे दिल्ली चिड़ियाघर को भेज दिया गया।

बेगम के तीसरे प्रसव से कुल चार शावकों का जन्म 10 जुलाई 1956 को हुआ। ये सभी सामान्य रंग के थे। इनमें से एक मादा शावक की मृत्यु दो दिन बाद हो गयी वहीं एक नर शावक “नरवदा” सवा साल की उम्र (14 नवंबर 1957) में मर गया। एक नर शावक “सुल्तान” 13 जून 1957 को अहमदाबाद जू को बेंच दिया गया, वहीं एक मादा “विन्ध्या” को 26 जून 1963 दिल्ली चिड़ियाघर भेज दिया गया।

बेगम के तीन प्रसवों में कुल 10 शावकों के जन्म के पश्चात् कोई भी सफेद शावक न होने से महाराजा रीवा निराश थे उन्होंने बेगम को 13 जून 1957 को अहमदाबाद चिड़ियाघर को बेंच दिया।

मोहन—राधा से सफेद शावकों का जन्म

सफेद बाघों के जन्म को लेकर महाराजा रीवा चिंतित थे, उन्होंने पशु चिकित्सकों और देश के महत्वपूर्ण प्राणी विशेषज्ञों से सलाह लेकर बेगम और मोहन के संसर्ग से पैदा “राधा” को मोहन का साथी बनाने का निश्चय किया। देश—विदेश के वन्य जीव विशेषज्ञों की सलाह थी कि मोहन से जन्मित राधा में कुछ न कुछ सफेद बाघ के अनुवांशिकीय गुण होंगे, इसलिए इन दोनों के संसर्ग से सफेद शावकों का जन्म हो सकता है। यह विचार 30 अक्टूबर सन् 1958 को सही साबित हुआ।

राधा ने अपने प्रथम प्रसव में 30 अक्टूबर 1958 को प्रातः चार सफेद शावकों को जन्म दिया। इनमें से तीन मादा तथा एक नर था। ये चारों शावक दूध के समान सफेद थे। सफेद शावक के जन्म से महाराजा रीवा को अत्यधिक खुशी हुई और उनकी सफेद बाघों को पैदा करने की योजना सफल हुई। इन सफेद शावकों की देखभाल महाराजा रीवा के विशेष निर्देशों में होती थी। इन शावकों के जन्म से रीवा महाराजा मार्तण्ड सिंह जू देव सफेद बाघों के खोजी नरेश के रूप में विश्वविख्यात हो गए। महाराजा ने इन चार शावकों का नाम राजा, रानी, मोहनी और सुकेशी रखा। राजा और रानी का जोड़ा 26 अक्टूबर 1963 को दिल्ली के राष्ट्रीय चिड़ियाघर को दिया गया, वहीं एक मादा सफेद शावक मोहनी को अमेरिका के वाशिंगटन चिड़ियाघर को बेंच दिया गया। तीसरी मादा सुकेशी रीवा में ही रही और 21 अप्रैल 1973 को उसे दिल्ली के राष्ट्रीय चिड़ियाघर में भेज दिया गया।



Radha with her 4 white tiger cubs

18 जून 1960 को राधा ने दूसरी बार तीन शावकों को जन्म दिया जिनमें से दो नर शावक सफेद थे। इनका नाम “नीलाद्री” और “हिमाद्री” रखा गया वहीं मादा शावक सामान्य रंग की थी, इसका नाम “मालिनी” रखा गया। हिमाद्री, नीलाद्री और मालिनी को 09 अगस्त 1963 में कलकत्ता चिड़ियाघर को बेंच दिया गया।

राधा ने 24 मार्च 1962 को अपने तीसरे प्रसव में चार सफेद शावकों को जन्म दिया। इनमें से दो नर तथा दो मादा थे। एक नर तथा एक मादा जन्म के कुछ देर बाद ही मर गए। बचे हुए नर शावक का नाम “चम्पक” और मादा का नाम “चमेली” रखा गया। चम्पक और चमेली का जोड़ा 22 जून 1963 को भारत सरकार के समझौते के तहत ब्रिस्टल जू इंग्लैण्ड को बेंच दिया गया।

राधा ने चौथे प्रसव में तीन सफेद शावकों को 20 अगस्त 1964 को जन्म दिया। इनमें से दो नर एवं एक मादा थी। नर शावकों का नाम “रमेश” और “रामू” रखा गया वहीं “मादा” शावक का नाम “रत्ना” रखा गया।

राधा ने चार प्रसवों में कुल 14 शावकों को जन्म दिया। 26 जून 1964 को राधा को दिल्ली के राष्ट्रीय चिड़ियाघर में भेज दिया गया जहाँ 2 मई 1974 को उसका निधन हो गया।

मोहन की तीसरी साथी “सुकेशी”

राधा के पश्चात् मोहन को सुकेशी के साथ रखा गया। सुकेशी, राधा के प्रथम प्रसव से पैदा हुई सफेद बाघिन थीं। मोहन से संसर्ग के पश्चात् 17 जुलाई 1963 को सुकेशी ने अपने प्रथम प्रसव में दो सफेद शावकों को जन्म दिया जिनमें एक नर और एक मादा थी मगर केवल तीन दिनों के पश्चात् ही इन शावकों की मृत्यु हो गयी।

सुकेशी के दूसरे प्रसव से 22 नवंबर 1964 को पुनः दो सफेद शावक हुए जिनमें से एक नर तथा एक मादा

थी। नर का नाम "गोविंद" और मादा का नाम "लक्ष्मी" रखा गया। गाविन्द 20 अप्रैल 1966 को राष्ट्रीय चिड़ियाघर दिल्ली को भेज दिया गया जहाँ से वह 24 सितंबर 1971 को हैदराबाद चिड़ियाघर को दिया गया। लक्ष्मी को 20 अप्रैल 1966 को विक्टोरिया गार्डन जू बम्बई को बेंच दिया गया।

सुकेशी के तीसरे प्रसव से 26 मार्च 1966 की सुबह एक नर एवं एक मादा सफेद शावक का जन्म हुआ। नर का नाम "गौतम" और मादा का नाम "गोमती" रखा गया। गौतम को 8 दिसंबर 1966 को राष्ट्रीय चिड़ियाघर दिल्ली को भेज दिया गया, वहीं गोमती को 12 जनवरी 1968 को अमेरिका भेज दिया गया।

चौथे प्रसव में सुकेशी ने 6 सितंबर 1967 को दो सफेद मादा शावकों को जन्म दिया। इनका नाम "चमेली" एवं "होमा" रखा गया। होमा को 06 अप्रैल 1968 को दिल्ली भेज दिया गया वहीं चमेली को 26 जुलाई 1976 को राष्ट्रीय चिड़ियाघर दिल्ली भेज दिया गया।

पाँचवे प्रसव में सुकेशी ने 17 नवंबर 1968 को एक नर एवं एक मादा सफेद शावक को जन्म दिया। जन्म के साथ ही मादा की मृत्यु हो गयी। नर का नाम "विराट" रखा गया। इस प्रकार सुकेशी ने पाँच प्रसवों में कुल दस सफेद शावकों को जन्म दिया जिनमें से चार नर एवं छः मादा थीं।

अलविदा मोहन

मोहन ने बेगम, राधा, और सुकेशी से कुल 34 संतानों को जन्म दिया जिनमें 23 सफेद व 11 सामान्य रंग के थे। इन्हीं चौतिस संतानों से संपूर्ण विश्व में सफेद बाघों की वंश वृद्धि हुई है।

मोहन जीवन के अंतिम समय में लकवा से ग्रसित हो गया था। शरीर का पिछला हिस्सा लकवा से प्रभावित था। मोहन को प्रतिदिन 12 किलो बकरे का मांस खाने के लिए दिया जाता था। रविवार उसका उपवास का दिन था। उस दिन भोजन के नाम पर उसको कुछ भी नहीं मिलता था। बीमारी की अवस्था में मांस के साथ गोली-दवाई रखकर दी जाती थी।

अपने जीवन के 19 गौरवशाली वर्ष के पश्चात् 18 सितंबर 1969 को सुबह 6:00 बजे मोहन का निधन हो गया। मोहन की मृत्यु पर पूरे रीवा में शोक छा गया। विश्व में रीवा का नाम अमर करने वाला मोहन सदा के लिए रीवावासियों को छोड़कर चला गया। मोहन के निधन से महाराजा मार्टण्ड सिंह बहुत दुःखी हुए। उन्होंने आदेश दिया कि—मोहन के सिर के भाग और चमड़ा को छोड़कर शेष शरीर को रीवा राज्य के झंडे में लपेटा जाय। बांस की अर्थी तैयार कर उसको फूल-माला से ढंका जाय। रीवा राज्य के पुराने सिपाही वर्दी में रहकर अर्थी को कंधा देंगे। जब अर्थी उठेगी तो सिपाही वर्दी सहित उपस्थित रहेंगे और बंदूक को उल्टा करके सलामी देंगे। अर्थी के रवाना होने पर आगे-आगे पैसा लुटाया जाएगा तथा अनाथालय के बच्चों को दान दिया जाय। उन्होंने किला के सिविल लिस्ट के अधिकारियों को अनिवार्य रूप से उपरोक्त मौके पर उपस्थित रहने के निर्देश दिए थे और शोक में रीवा किले के अधिकारी-कर्मचारियों के लिए अवकाश घोषित किया गया था।

वन्य जीवों के संरक्षण एवं संवर्धन में महाराजा मार्टण्ड सिंह का नाम अविस्मरणीय रहेगा वहीं सफेद बाघों के संस्थापक पितामह के रूप में मोहन हमेशा याद किया जायेगा।



लेखक के बारे में

नलिन कुमार दुबे : अवधेश प्रताप सिंह विश्वविद्यालय रीवा में जवाहर लाल नेहरू नीति शोध केन्द्र में विगत 28 वर्षों से पदस्थ हैं। समाज शास्त्र, नीति विज्ञान के जानकार हैं। जनसंख्या नीति, जनजातीय अध्ययन, जनांककीय अध्ययन, रीवा राज्य के क्षेत्रीय इतिहास, लोक संस्कृति एवं साहित्य तथा पर्यावरण एवं वन्य जीवों पर लेखन में विशेष रुचि।

BIODIVERSITY CONSERVATION

Sudhir Ahluwalia
Ex. IFS

Threat to Future Research

ABSTRACT

Over sixty percent of currently used anti-cancer agents are derived from natural sources such as plants, marine organisms and micro organisms. Flora protection, in biodiversity sites in India, is a by-product of fauna protection. While from the conservation perspective the genetic resource is getting protected but the shift in management emphasis has led to re-education of the work force. This has serious biodiversity conservation consequences.

Plants have been a major source of medicinal molecules over the millennia. Research to identify new molecules from plants is actively funded by government, private pharmaceutical companies and natural product focused research bodies.

Each year dozens of conferences in which research work on medicinal and other plants is presented, are held across the globe. These conferences are well attended. While in India, research on medicinal plants is sporadic, there is a vibrant research activity in developed parts of the world. There are very few publications from India that are accepted for release in high impact scientific journals.

Over sixty percent of currently used anti-cancer agents are derived from natural sources such as plants, marine organisms and microorganisms. (Newman, D.J et al, 2002). Vinca – the Madagascar periwinkle (*Catharanthus roseus* or *Vinca rosea*) is one of the earliest sources of vinca alkaloids – vinblastine and vincristine. These are used in chemotherapy. Semisynthetic derivatives of these alkaloids have since been developed.

Podophyllum peltatum resin was used to extract podophyllotoxins. These have anti-cancer properties. Clinical use of this class of medicine have been suspended due to their severe side effects.

Camptotheca acuminata, *Ophiorrhiza pumilasya*, *Mapia foetida* are source of colo-rectal cancer drugs. Semisynthetic analogs of this medicine have been prepared. Taxanes derived from Yew trees – *Taxus baccata* are used to manufacture of taxanes (paclitaxel, docetaxel). These molecules also are used in chemotherapy. *Taxus baccata* is native to Europe and Central Asia. It is found in the Himalayan region too.

Half of all anti-cancer drugs approved globally are either natural products based or derived from natural products. According to the Natural Products Branch which is the part of the Developmental Therapeutic Program of NCI, agencies across the world are collecting for research thousands of samples of plants and other natural product sources like marine organisms.

It is estimated that only one percent of the approximately 5,00,000 plant species worldwide have thus far been investigated. (Palombo, E.A et al, 2006). The interest in natural products in developing new drugs for various ailments continues unabated.

The Threat

Most plants, and this includes fungi, algae, bacteria and other micro organisms, are found in forests and biodiversity rich areas. Some of these sites are in fast growing developing countries like India, China, East Asian regions, Latin America and Africa etc. With the rising pace of economic activity, many biodiversity rich areas in these regions are under severe threat.

The hottest biodiversity often covers sites that are rich in minerals. In emerging economies where the demand for mineral resources is intense, concerns on biodiversity conservation are frequently forcibly muted and such sites opened for mineral exploration. The Kudremukh iron ore mines in the Western Ghats region of India is one such example.

Rising need for energy especially non polluting energy sources make hydel power an attractive option. Damming rivers, building reservoirs for irrigation often results in submersion of large tracts of rich biodiversity areas. The Kali hydel project submerged pristine evergreen forest in Karnataka.

The pressure of rising populations, demand for land for housing, cities, roads, rail, airports and other infrastructure is adding pressure on existence biodiversity.

In East Europe, natural forests are getting converted into pine. Mercifully this process has ceased in countries like India where production forest management systems are being rapidly replaced by conservation forestry. This change is not global and conversion of evergreen, biodiversity rich forests in East Asia into oil palm and other industrial crops continues apace.

Flora protection, in biodiversity rich sites in India, is a byproduct of fauna protection. While from the conservation perspective the genetic resource is getting protected but the shift in management emphasis has led to re-education of the workforce.

I notice that in most conservation areas, the level of local understanding of flora of the region has eroded dramatically. Very few people who can identify and understand local herbs and shrubs remain. Botanists who are not associated with the forest department find it hard to get access to biodiversity sites. Conservation regulation and red tape have become major impediments to research.

Ayurveda doctors who traditionally were the repository of knowledge of herbs and plants, their skills are now restricted to use of plants in medicine. They have no access to forests and depend on plant collectors and middle men for raw material.

Finding raw material for research is becoming more and more difficult. Nearly all research institutions are being forced to raise herbs for research in their campuses. This has restricted the availability of genetic raw material.

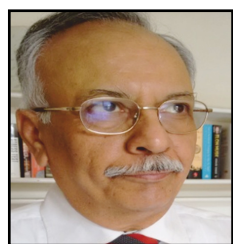
Most of genetic material for research lies in microflora, herbs and shrubs which are getting locked into conservation areas. Much of this flora is either not relevant or regarded to be irrelevant to survival of fauna. Neglect is leading this resource to disappear from the mind map of biodiversity area managers.

The scenario portends poorly for the future. Forest managers and planners require to rapidly reverse this trend before it is too late.



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SUNDARBANS

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Sundarban is largest deltaic region of world, encompassing hundred of islands in India and Bangladesh, which are formed by Rivers Ganga and Brahmaputra. The islands are separated by smaller rivers branching out from two major rivers. Indian portion of Sundarban has 102 islands, of which 48 have human settlements. It occupies an area of 4263 sq km, and situated in South 24 Paragana district of West Bengal. In 1989, it was declared as Sundarban Biosphere Reserve. 362 sq km of Sajaneckhali Wildlife sanctuary, 1330 sq km of Sundarban National Park and some Reserve Forests of Basheerhat Range totaling up to 2585 sq km constitute Sundarban Tiger Reserve. It is one of the original nine Project Tiger areas of India declared in 1973. Sundarban National Park extending over 1330 sq km was declared as natural World Heritage site in 1985.



It is only mangrove tiger habitat in the world spread over two countries. 40% of entire Sundarban is in India and the remaining 60% is in Bangladesh. It is named after Sundari trees (*Heritiera fomes*) in mangrove forests. This tree was once found throughout the area, over the years has confined to eastern and southern sector. The shift in distribution is attributed to gradual reduction of sweet water, as rivers are cut off from the origin due to siltation and remain connected to sea.

Among the mangroves species, the fruits and leaves of Keora (*Sonneretia spp*), Hental (*Phoenix paludosa*), Genwa (*Excoecaria agallocha*) and Baen (*Avecennia marina*, *A alba*, *A officianalis*) is favoured by Cheetal and Rhesus macaque.



It is home of large number of threatened fauna such as tiger, fishing cat, estuarine crocodile, Gangetic and Irrawady dolphin, King Cobra and water monitor lizard etc. It harbors significant population of river terrapin (*Batagur baska*). It is nesting ground of marine turtles. It is home of Trans Himalayan migratory birds. Eight out of twelve species of kingfisher are found here.



More than 200 years ago, human settlements started in some of these islands with clearing of forests and construction of earthen embankments to prevent ingress of tidal water. Despite shortage of drinking water and irrigation facilities population went on growing and presently 48 islands are occupied. With the gradual loss of forests, conservation value of mangroves has been realized.



More and more cyclones in Bay of Bengal are the impact of the climate change. Over past decades, the cyclones have become more frequent and also more intense. Fertile agricultural lands are increasingly becoming saline, which is affecting the socio economic conditions of the communities residing in the areas. After the cyclone, all aquifers become saline and it takes four to five years for land to regain fertility.

Many of these islands are facing the threat of submersion, which brings misery to the people. It would also impact the biodiversity and status of many threatened species taking refuge in these islands.

Islands without human habitations, especially in southern portion extending up to 2585 sq km have been constituted as Sundarban tiger Reserve. On the eastern border of the Reserve, River Raimangal separates India and Bangladesh and the border is porous.

Miscreants from India as well as Bangladesh enter the Reserve in boats for fishing, crab collection, honey collection, illicit removal of trees, and hunting of wild animals and also poaching of tigers for trading its body parts. The Tiger Reserve management of India faces the challenge day in and day out. They also remain in touch with their Bangladeshi counterparts.

Water is the only mode of transportation to these islands. Patrolling parties also move in rivers and creeks on boat. The Department has 23 Anti-poaching camps located on some of the islands within the Tiger Reserve. In addition there are seven floating camps, where all members of the camp stay in a boat and use another boat for patrolling through narrow creeks within the islands.

It is not easy to patrol the jungle within islands. One has to walk in slushy soil where speed comes down. Regular high and low tides keep the islands slushy. There is always threat from tigers hiding in the bushes. Unlike tigers in other reserves, Sundarban tigers can hunt human. Even if the tiger is at a distance, one is unsafe as boat has to be approached through slushy soil.

Honey collection, cutting of trees and crab collection cannot be attempted by miscreants without getting down from the boat. Sometimes miscreants are killed by tigers and matter does not come to light.

Many southern islands are without any anti-poaching camp. Establishing a camp on any of the islands is difficult. After selecting the spot, a jetty is constructed, followed by construction of earthen embankment for prevention of tidal water entering the proposed area, Chain link fencing of the location to prevent the straying of tigers in the area. Once basic facilities are ready, sweet water pond, buildings for residence & office and footpath using stone slabs has to be constructed.



Sweet water ponds for wild animals are also constructed adjoining the camps. Earlier sweet water ponds were constructed on many islands away from these camps, but poachers used the spot for hunting. The management took a conscious decision to close down all water holes which are not located adjoining camps. Wild animals in Sudarbans also depend on salty water.

Human tiger conflict in northern islands with human settlements is quite alarming. Tigers have been straying in human areas and causing human death. Now the management has evolved a cost effective and practical technology of nylon fencing. 94 km length between human and tiger interface is covered. Nylon ropes are purchased and some families among the local communities stitch 8 to 10 feet high net, which is fixed along the periphery using bamboo. This is the most effective method of keeping tigers away from human areas. It has brought down the straying incidences as can be seen below;

Year	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
No of tiger straying	22	17	4	8	14	14	21	27	17	12	2	2	1	0

Nylon fencing has not reduced human death by tigers, as people visit southern islands, where there are no nylon fencing, in search of livelihood like cutting of trees, fishing, crab collection, honey collection, hunting etc. Human death caused by tigers from 2010-11 to 2016-17 in Indian Sundarbans are 6, 3, 8, 7, 14, 10 and 9 respectively. Totally 57 people were killed by tigers in last seven years.



The data collection from trails and transects in every beat is in progress in all the tiger states. In Sundarbans, the data is collected by moving in boats in creeks through islands as well as in water along the shore. Camera traps are also laid in 2 sq km grids by moving in rivers and creeks. No camera is laid in grids in the interior of islands, as it is unsafe for staff to move on foot. 63 individual tigers are captured in Camera in the last camera trap exercise in 2016-17.

The climate change has been impacting this UNSECO World heritage site. We should minimize interfering with nature, so that we can prevent further irreversible damage to unique landscape.



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THE GHOLA MAN-EATER; CLOSE ENCOUNTERS

Rahul Shukla
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Facing Death in the Dark

"Man has tasted tiger's blood for centuries without having been tasted much in return. Now it is the time for them."

- Billy Arjan Singh

The afterglow of the sun lingered over the farmlands of Gholā. The air was cold. The two men settled in the front and driving seat of the Gypsy were Billy Arjan Singh and his brother Balram, while I with Aftab Wali, the Assistant Wildlife Warden of Dudhwa National Park and my old native tracker Phagunia were seated in the rear boxbody of the vehicle. I had a .416 magazine John Rigby rifle loaded with heavy caliber bullet of 410 grain, metal covered, with 70 grain smokeless powder that generates a striking power of 17 tons; an immensely potent wallop for any large sized, dangerous animal including elephants.

Phagunia had a .32 Indian Ordnance pistol holstered at his waist, while Billy had lent Aftab his Holland & Holland .375 Magnum rifle. The fatal weapon had a very tough safety lock but an exceptionally weightless trigger that fired at the hair touch of the finger and even our protagonist Billy was unsure as how to operate its tricky mechanism. The gun's reliability had so deteriorated that it often fired upon at the sheer unlocking of safety catch.

The ungodly weapon was as unusable as a cricket bat against a tiger and juxtaposed to Billy, this act was also uncharacteristic of him for as a rule he had always kept his firearms in excellent condition.



We were on our way back to Tiger Haven (Billy's residence) from Sathiyana forest range. No one spoke much. The radiation fog that usually settles in the night had begun to take over the tract. The sound of the Gypsy's engine as it moved off seemed to drill into the peace of the evening. We had driven about a couple of miles, when we passed close to the hutments of a small village Gajraora. Daylight was on the point of withdrawal and the brightly pinpointing stars had begun to lurk here and there, when we saw a figure silhouetted gently against the fragile light, sitting in a squatting form with its back towards us. Distinguishable as large animal, it was looking towards the lonely hamlet. The headlights and extra lights of the vehicle were instantly put on.

Disturbed by the cutting beams the animal turned his face towards us, his eyes reflecting the glare with the ambiance of burning fire. This was the man-eater of Gholia that had terrorized the villagers and squatters of the farmland for over a month.

Aftab had often seen this tiger earlier; he immediately recognized it, confirming its identity and the hunter's problems were enormously simplified. Our unanimous thought was to deal with it immediately; a right moment to give the quietus to this terrible menace. Not bothering as who shall shoot the tiger – Billy, Aftab or I – I rested the gun on the open iron bar and aligning on the tiger that was some fifty yards away slowly slipped the safety catch off to fire. The gun was dunked with hyper lethal bullets, proven tiger killers that mushroom inside the body as they carom around slashing everything in their path. I was about to fire when Billy reached his hand, grabbed the barrel crosswise and pushed it vehemently down with force. It shocked me awfully, stopping me from pulling the trigger.

"Nooooo, this is not the man-eater," he said emphatically, turning his neck and looking into my eyes. Though Aftab ruled out the possibility of this being the wrong tiger and even Balram questioned if it was not the man-eater then what the hell the fella was doing so close to a human habitation. But Billy by some peculiar process of deduction, declared it to be a tigress and as resolute as ever, appropriated the Rigby from my hands. He even unwittingly evoked his sarcasm upon me: "This is your sugarcane tiger boy, and you want to shoot it!" Billy was thoroughly critical of my sugarcane tiger theory, because I had branded his



pet tigress Tara reintroduced in wild, not as wild but as feral tigress, just as pet cats readily go feral, and this nomenclature was a pain in his neck. However, this was no good moment to scoff a sniper shot at me when the tiger was there.

Save for the old man everybody was dead sure of the animal being the actual man-eater, earmarked for annihilation. For a moment I thought that the old fuddy-duddy will slip down the car noiselessly, track with heroic skill and shoot from my gun as his gun was quite useless for any emergency. I sat quiet but no shot rang in the vista, moments later the tiger slipped into the thicket of sugarcane and silently dissolved his stripes into it.

All five of us got down from the vehicle, Billy holding my rifle like a broom, which he didn't put back in my hands despite my asking. Aftab led the way breaking trail with that ungodly gun, while I followed him literally disarmed, feeling the absence of the reassuring weight of a .416 in my hands. Phagunia was behind me with a ready pistol in his hands, which in any case was virtually useless against a dangerous mega fauna. The tiger had indeed vanished like ectoplasm though the ammonia of his 'very musky' urine, much stronger than normal squirted on a tree slapped us in the face. A farmyard could be attar of roses in comparison with the vile stench that saturated the ground and atmosphere because the marking fluid with its base in uric acid is loaded with many chemicals like cadaverine, phenylethy-lamine and putrescine including pheromones that stimulate sexual activities in opposite sex but reek pungently. We examined the tracks, which showed to be definitely of a male and by all possibilities the right tiger. Darkness had set in. Beyond the radius of thirty yards, the inky blur of nightfall hid everything in its fold and at such a time rooting the man-eater out of thick sugarcane was not our idea of good fun.

The Gypsy's headlights shown brilliantly on the undisturbed vista while the only shadows cast by Billy and his brother were falling upon us long and wavering. There was no indication of the killer being around but under the circumstances he could have easily taken any one of us at a point blank range in a single stride.



“Professor Sahib, I don't think we need to follow blindly along the trail with this dum-dum gun,” said Aftab, “in case the tiger has not moved away and makes up his mind to launch an attack at this moment, we will be in trouble.” I also felt the same. Perhaps the tiger was still around and fully aware of our presence, perhaps watching us clearly or might even have taken a position of advantage by now. Evaluating the danger involved in this performance, when I had no weapon for self-protection, and our tracking could influence its behavior made my skin crawl. We immediately left the tracks and came back to the vehicle.

Our return journey to Tiger Heaven was a bit frustrating; Balram was absolutely unable to rationalize his brother's incorrigible stand which was perhaps an impossible opinion. Though he and his brother were well attuned to each other in jungle matters but now the identity of the man-eater was no longer in jeopardy, he grumbled all the way and was thoroughly critical of Billy.

Despite an impressive know-how about all tiger hunting expertise available in the Tarai represented by our confirmed killer team, the end goal, however did not harmonize at all. In fact it turned out to be a fatal mistake on our part to let the stamped killer past the worst.

The tiger hadn't gone anywhere. He was actually very much close at hand, veiled in the deep darkness of sugar, avoiding us, thinking on its legs and watching us intently. About an hour after our departure, he didn't waste much time in sorting out a human victim. The petty farmer, named Budhai was leveling his field, in the semi full moon, just behind his hutment with buffalos yoked to a plank when the tiger suddenly materialized from behind the thick trunk of a Neem tree, seized the man, and without pausing to kill, dragged him into a sugarcane retreat. Hearing his shrieks, the rescuers ran protesting and the killer jogged away leaving the man but in that short time, the scissor shaped incisors had created large holes in his neck and chest and sheared away a huge chunk of meat from the back. The man was rushed to a dispensary five miles away but he died in the way from the rupture of major blood vessels bleeding excessively.



Next day when the news of human kill arrived, the place and the timing of the kill directly corresponded with our presence on the spot and we all including Balram and Aftab felt shocked as if reduced to impotence. We felt the answerability of Budhai's death rested squarely on our shoulders for had we availed the fine opportunity last evening, the man would not have met this gruesome end. There was nothing we could do about it but to wince and admit the setback, as the sight of wretched man's remains haunted me for many days.

Thunder Claps and Tiger Roars : The day after this tragic incident a heifer was tied towards the afternoon close to the spot where Budhai had been condemned. I with Phagunia and Aftab –designated to lead the shooting team – perched ourselves on the machan. Our armoury on that day comprised a .12 bore shot gun, a 30 Springfield rifle and as usual my .416 Rigby; the gun that was once the emblem of Nairobi based Norfolk Hotel, where the most colourful bunch of professional hunters ever draw together for sun downers. The gun was needed to qualify for an unrestricted professional hunter's license in Kenya besides years of hard big game hunting experience that constituted a most serious business.

Extended before me was the immense sugar biome of Ghola, 3000 acres of old buffer area, the land configuration of which is in a shape of a cup; with a lake in the center that stretches immediately outside the park opposite Sathiyana range. It was once a favoured haunt of swamp deer, and now had been cleared of ratwaand narkul grass and turned into prosperous cultivation fields. Every year during winter months, tigers came to live here without break in the sugarcane crops, which are planted right up to the boundary of the forest. But this time the tiger that had come to live here had developed a sweet-tooth for villagers, taking to serial human killings.

This tiger later branded as the Ghola man-eater, operated in an exclusive farmland area falling between Puranpurwa, Gadaniya, Mehangapur, Gajraora and Padua. It was this phase that while visiting Dudhwa, I became involved in this man-eater's hunt for a week's time.

That day we had been on the machan for over four sunny hours. As dusk fell, the February evening started getting chilly and soon a storm begun to build up over Sathiyana range. Enormous piles of clouds appeared in the east, obstructing the golden emissions of the declining sun. The clouds grew like a brown rose that flickered splendidly from within. The sky blazed with most vivid lightning and a drizzle started slowly cooling the earth.

Not long before, the winds escalated and a ferocious thunderstorm rolled in. The torrents of rains waved over the boundless expanse of cane and a heavy sheet of water drenched us to the innermost. There was no use sitting for the man-eater so we decided to abandon the vigil. Phagunia packed my rifle in a plastic cover and we started the walk back to our camp in Ghola. The village was some two miles away as the crow flies. We took the cart track that wound past the sugarcane fields. It was an unusual evening with strange lights and thick brown clouds, and the village was half an-hour's walk away. After walking for just about five minutes, I was like a drowned rat as streams trickled inside my jacket, giving an uneasy sensation to my body. It was too dark to distinguish objects on the ground that had become fairly watery and there were splashing sounds as we put one squelching foot behind the other. Walking in the incessant flashes of lightning and thunderbolts was quite a toilsome experience. Intermittently the farmland glistened green, as the vault of heaven rent asunder and then it would be dark again, as dark as the inside of a black sack.

With lashing winds adding to our woes, we sensed quite a few dark inky masses of wild animals crossing our path. They appeared uneasy and apprehensive, moving like specters in some fearful disturbance and there was no misunderstanding about it. More animals followed. We heard the

characteristic trampling of their hooves on the drenched ground. None of us were actually able to identify the passing animals when a flash danced in the sky, and the light did not seem to illuminate so much as to penetrate the wild animals, which was in fact a sounder of wild boars.

As we toiled forward we came upon lots of swamp deer in a green wheat field. They had come out on their nightly feeding rounds, standing like phantoms with their backs to the driving winds and rains. One swamp deer fawn never moved at our sight though we passed it within 5 yards. He was shivering with cold and standing with its head down between its forelegs. It gave the impression of a dim ghost that was praying for stillness and peace to return.

The expanse of Gholia farmlands falls in a low-lying band where the water cascades down from higher surroundings creating a temporary deluge. The water level had suddenly risen and its unbroken sheets appeared to threaten us with inundation. My men, though used to severe thunderstorms, were apprehensive and wanted to hurry back home and I am also not exactly among those who might be called afraid of the dark, but I do not deny that a certain percentage of my boldness disappears with the passage of daylight. It was this moment when the nature's deadly drama began.

There was silence for half a minute when the interjection of a tiger floated in the air. I heard a clear a call h-oo-w-m- aauangh-aauangh that was much different from the gurgling rumbling of clouds. It sounded so loud that it was difficult to guess the direction it was coming from. But I felt sure that it came from very close to my left. The call had an instantaneous effect on an unseen herd of blue bulls. There was consternation in the cane fields, followed by stamping of several hooves as several antelopes crossed the cart track before us. Their shadowy silhouettes, parallel to huge phantoms, bounded forth in a mad flight. My heart leapt to my throat. No hiding of the fact that they crossed so close and at such a pace, that I was afraid. The blue bulls are toughened animals which might make even a Jeep overturn should they hit it on the road. A man on their stampeding route would stand no chance.

All of us halted in our tracks and letting the blue bulls pass, moved our torchlights over the fields. Nothing was visible clearly in the pelting rain as a sheet of blurring haze covered the objects around. But soon to our left, the outline of a head became clear as a pair of burning eyes reflected the glare and we all recognized them to be that of a tiger.

The environment was not conducive for any meeting with a tiger, when my rifle was in its cover. Very slowly I uncased the gun but I had to load it since per habit I had not left a cartridge in the chamber while covering it. The surroundings seemed to be charged with a nervous tension as I loaded the gun swiftly and mechanically. Unfortunately the cunning beast understood my gesture and before I could line the beads he retreated slowly. His dark shadow shifted up to a neemtree and then vanished.

After a few minutes' silence, the short loud calls of auaangh, auaangh again emanated from the diametrically opposite direction of North. The solo singer, perhaps a different tiger growled quite a few times then his calls ended in a long drawn staccato huh-uh-uh. Shortly after, this rumbling call was responded from the South; deadlier and angrier than the first and roughly from the same distance as that of first.

Quivering with adrenalin we listened to ferocious growling's. There were apparently two tigers, located some hundred yards away from each other. A straight line drawn between them would have crossed my stomach. But all this was only a prologue to a drama that was about to begin. The darkness was thick again and it was hard to realize that we had inadvertently reached in the midst of two great cats that were not finding themselves fitting to co-exist with each other. The rain lashed strongly, a blinding flash ran

zigzag in the sky and a terrific crash of thunder boomed. With that, their real dialogue started. The two giants steadily increased measuring the colossal strength of their lungs. They roared their questions and replies so aggressively that the confab soon turned into a deafening serenade, awesomely terrifying.

Our every nerve was drawn tight. It seemed that the balance of power was being tested by vocal means rather than force. There was another exploding boom that temporarily seemed to hold the forked sheet of lightning suspended in the sky. This was no long distance communication. The tigers were keen to meet and were approaching dangerously closer to each other. Roars, growls and coughs are specific signs in tigerine language, and since I don't speak it, I could not understand whether it was meant to convey rage, hunger or love. It could also be just their capricious temper, which can change from good to bad like sunshine to thunder; or perhaps by co-incident their royal route had just collided tonight.

There is a vast difference between tiger roars emanating two miles away and twenty yards away. Defiant tiger roars are stupendous, that might dreadfully equal the vibrations of a supersonic plane taking off. These spatial warnings, preserving the sanctity of a tiger's freedom, have an uncanny power to full-fill encompassing space, sometimes so wholesomely that they make you feel fearfully small. Unsure of their accurate location, you sense 'a premonition of death' and the loud growls begun to reverberate in your stomach.

The hair on the back of my neck tingled. The setting gave me a feeling of being in an immense theatre of nature where the play had started but the curtain had still not lifted. Phagunia wiped the rain water from his face and was the first to fire his gun, followed by Aftab, who boomed quite a few rifle shots in the direction of the roars. Under such wild conditions of weather and place, I would really have preferred any other kind of sound imaginable than this 'chilling to the bone' music of power struggle, in league with the gut-wrenching powers of darkness which then seemed as if it would never end.

Interestingly, the big cats were not concerned with our presence; even gun firing had achieved no effect on their aggressive postures. Aftab was sure that this offending tiger was the man-eater. He said the attention of rogue was so engrossed in chasing his rival that "the risk of we being attacked by him was reduced to zero."

Tiger fights are rather like a squabble between domestic cats, in which far more time is spent in bounding, snarling and threatening each other by growling rather than engaging in actual physical confrontation. Blows are exchanged only briefly and are divided by long periods of posturing and maneuvering where the real purpose is to chase the rival away and not to kill it. After enough of a verbal duel, the stronger one started chasing the weaker which ran away, apparently not wanting any kind of physical confrontation.

The tigers were now thoroughly involved and baying for each other's blood. Next we heard the characteristic thumping of their paws on the swampy ground, as the curtain partly lifted on the play and the actors passed from close quarters. Then suddenly there was more crashing of canes, shrill screaming and snarling as the tigers passed through dense canes. By far sugarcane is the worst country to face dangerous predators and a hopeless vegetation to be enveloped in when matters are serious. It is especially so when one is dealing with irate tigers, which have been known to cover hundred yards in just over four seconds when charging. But such chase is intermittent, and the speedy bouts last for a few seconds. They tire easily and after a few moments, sprint again.

However, no human being can withstand these powerful animals and if the devastating killers collided with us headlong, the enormous projectile energy of their terrible claws, with hundreds of pounds of their weight, would instantly inflict fatal wounds.

The situation was not to our liking but Lord Hanuman's grace kept our courage high over fear. Phagunia again boomed the .12 bore shot gun, the lead ricocheted in the clouds that appeared normal with the raging hurricane but the tigerine chase remained unaffected. Perhaps the weaker one, being pursued with insatiable furry and having perceived human presence, was trying to seek protection through our intervention. He was not ready to leave our neighbourhood.

The climax of the drama had begun and it seemed wise to put ourselves further out of reach. With mingled astonishment and unease we slowly squelched our way, through the stubborn clay, furtive and bedraggled in the pelting rain when the hectic runaround completed a few more circles and the sparring continued for good ten minutes around us. Like madly sputtering rockets, they circled twenty to thirty yards in canes and then crossed the cart track. At every one to two minutes, I would hear the distinctive thudding of their paws as their ghostly forms crossed the road. Sometimes from our back, sometimes from the front, sometimes sliding through the mottled murk and sometimes literally air-borne – but they were never more than 20 yards far from us.

The sugarcane was as thick as the human wrist and often so tangled that it was impenetrable at any pace, yet it broke like matchsticks against this ferocious struggle. I could clearly hear the splashing paws, the panting sound of air being sucked in through their mouths, admonishing each other in a piercing falsetto. The electrifying experience held us mesmerized in the awe of super predators.

I dared not put my rifle down for it was my only life insurance against worst. The unique conversation of super cats was more of a tolerable zephyr as compared to this high voltage chase which now seemingly foretold an earthquake. It was remarkable that the strong paws with tough springy cushions that allow tigers to stalk their prey with deadly silence produce so much of sound when running.

I did not want to experience as to what it feels like having a tiger's large body across my neck, yet the sounds of those thumping paws were a trifle more communicative than the brain-paralyzing impact of their ultrasonic dialogue.

A streak of flame, in the meanwhile zoomed in the clouds and like gigantic white splinters of broken glasses, wrecked from a cosmic window, it dispersed here and there in the sky so that everything visible was bathed in pure white light and the shadows were pure black – no less.

We were sure that the chasing tiger was the man-eater of Gholi, while the other one, driven out of the jungle by the raging savannah fires, had just arrived in the cane fields. Phagunia was mumbling gibberish, "Goli Maro Saley ko", (Bust the bastard without delay). The fella had been a lifelong hunter. He wanted us to attempt just plain bum shooting at the chaser. In his view if we three stood ready together and fired a fusillade as soon as the tigers broke cover, the bullets might strike the man-eater's heart and lung from the broadside. But I was partly hesitant because my earlier jungle training had tutored me to not to take running shots at unwounded animals when the shooting does not offer enough time. The fighters only became visible when they crossed the Kuccha road. They would be spotted for brief seconds then again enter the cane break. This situation seemed, just for laughs, practically comparable to clay bird shooting where it is difficult to figure out the speed of the bird and render it into microsecond trigger response for a perfect shot. In such cases the target is achieved by gunner's own reflexes from the instant he wills his trigger to move until the time the machine actually releases the clay bird. Moreover, the smaller pellets in a bigger 'shot-swarm' achieve the target with multiple hits where as a rifle has a single bullet to strike.

There are many uncertainties in tiger hunting; outstanding sporting qualities were demanded of the man who should bring down the chaser neatly in the dimming lights without plugging the wrong one, which at least I did not possess. And above all in such weather conditions, there was a fair chance of being maimed or killed by tigers than succeeding in busting them. Finally when Aftab also declined to handle the situation -saying it would be a lousy shooting for which we are not especially known- I gave up and eased off the trigger of my gun.

The play was drawing to an end. After hanging overhead for an hour, the rain suddenly stopped as unexpectedly as it had begun and with that the sparring and growling also attenuated. The storm passed and the period between the flashes and crashes denoted its movement towards west, where the tigers also followed and went away into the depths of larger sugar farms. The temperate growls of the benefactor, perhaps still in chase grew fainter as the duo faded out in the vast sea of sugar grasses.

The relief from enormous tension was palpable. We restarted our journey back for the camp watching the pall of clouds.

A week after this incident, I was in Lucknow when the Gholia man-eater was shot dead in a joint operation of Forest Department, managed by Aftab Wali with Raja Somendra Shah and Billy Arajn Singh. Billy claimed in his books to have shot the man-eater himself that was later perforated by unrestrained feu de joie firing; however foresters and locals maintain that the tiger was done away by Raja Somendra Shah.



About the Author :

Dr. Rahul Shukla, a scion of a feudal family from the Tarai, is a noted field expert of farmland wildlife. Fondly called 'Tiger-Champ' by friends and admirers, he has served as member of State Wildlife Advisory Board U.P. (1995 to 2001, and also as Honorary Wildlife Warden of Dudhwa National Park & Kishanpur Tiger Reserve. In last 40 years he has devoted much of his energies to the task of gathering data about sugarcane tiger phenomenon of the Tarai and preparing the case-histories of over 100 tigers that lived in farmlands. The data helped him to theorize the living of tigers in sugar-farms and moot the concept of Sugarcane Tiger, which is considered a stand-alone model and a path-breaking work of its own kind.



Dr Shukla serves as Associate Professor in the History Department of Lucknow Christian Post Graduate College of Lucknow University. In his earlier days he joined quite a few Man-eater hunting teams, constituted by Late C. B. Singh IFS, Chief Wildlife Warden of U.P. and since then he has tracked many aberrant tigers in sugar farms assisting forest department with his peculiar knowledge about farmland dwelling tigers. An accomplished gun-handler and conservationist, he has written nearly half a dozen research books on Tarai tigers, namely Killing Grounds (1993), Leopards in the Backyard (2001), Tiger (2007), Sugarcane Tiger (2013) and Tigers in the Long Grass (2017) which have been appreciated by Dr Ullas Karanth & Dr George Schallar and fore worded by celebrities like H.E. APJ Abdul Kalam, the President of India and Maharaja Karan Singh, the founder Chairman of the Project Tiger.

ENCOUNTER WITH *DABOIA RUSSELLII* (SHAW & NODDER, 1797), THE RUSSELL'S VIPER AT SAHASTRADHARA, DEHRA DUN (UTTARAKHAND)

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ABSTRACT

The present communication deals with the occurrence of deadly venomous Russell's Viper (*Daboia russelii*, Shaw & Nodder, 1797) in Sahastradhara area, Dehra Dun, a nature's hub and famous tourist site. Besides the characteristics, distribution, natural history, conservation status and threats, the type of its venom, bite-symptoms and treatment have also been provided for general awareness.

Keywords: Russell's Viper at Sahastradhara, Dehra Dun.

INTRODUCTION

The reptilian fauna of Uttarakhand (Western Himalaya) has attracted the attention various workers during the past (Wall, 1906, 1907; Bhatnagar, 1969, 1972; Waltner, 1975; Lamba, 1987; Chopra, 1979, 1995; Osmaston & Sale, 1989; Husain, 2003, 2004; Husain & Ray, 1993, 1994, 1995, 1997; Husain & Tilak, 1995a,b; Sanyal et al., 1997; Bahuguna, 2008, 2010, 2014; Nawab & Srivastava, 2008; Dhavale, 2013) but nothing much is known about snakes from Sahastradhara, a nature's hub and famous tourist destination Dehra Dun.

Recently, *Daboia russelii*, the Russell's Viper has been sighted twice in Sahastradhara area. It is, one of the most deadly venomous and highly feared snakes, responsible for causing the most snake bite incidents and deaths among all venomous snakes due to its wide distribution and frequent occurrence in residential areas. In view of this, a detailed account (identity and natural history) was very much needed and hence provided here for general information and awareness.

Originally it was described as *Coluber russelii* by Shaw & Nodder in the year 1797 from the Coromandel Coast of India.

SAHASTRADHARA: STUDY SITE

Sahastradhara, also called 'Sulphur Springs', located in Lesser Himalaya, at the base of Mussoorie Hills, between 30°23'07.6" N Latitude and 78°07'44.9" E Longitude and with 830 m altitude, lies at about 14 km, north-east of Dehra Dun city. The area, rich in wild vegetation harbouring rodents, shrews, lizards, snakes, arthropods etc. and streams with amphibians, makes a suitable niche for the snakes.

***DABOIA RUSSELLII* (SHAW & NODDER, 1797)**

Russell's Viper, Chain Viper



Figure: *Daboia russelii*, the Russell's Viper

Coluber russelii Shaw & Nodder, 1797. Nat. Misc., 8: pl. 291 (type-locality: Coromandal coast, India).

Vernacular Names: *Chitti, Daboia, Gonus, Kander, Kaudia, Parran* (Hindi), *Bora, Chandrobora, Uloobora* (Bengali), *Chitalo, Khadchitalo* (Gujarati), *Kolakumdala, Mandaladha Haavu* (Kannada), *Gunas* (Kashmiri), *Chenathandan, Kannadiviriyan, Kuthirakulamban, Manchatti, Mandali, Payyana Mandali, Payyani, Pullan, Rakta Anali, Raktamandali, Rudiramandali, Rakhthaanali, Thavitta, Vattakura* (Malayalam), *Ghonas, Tawarya* (Marathi), *Chandan Boda* (Odia), *Koraile* (Sindhi), *Retha Aunali, Kannadi Viryan* (Tamil) and *Katuka Rekula Paamu, Raktha Penjara or Penjari* (Teugu).

Classification: Class Reptilia Laurenti, 1768; order: Squamata Oppel, 1811; suborder: Serpentes Linnaeus, 1758; family: Viperidae Oppel, 1811; subfamily: Viperinae Oppel, 1811; Genus: *Daboia* Gray, 1842.

Sightings: 4:26 PM, 31 March, 2016, at village Nagal, in front of Uttaranchal College of Science and Technology, Sahastradhara, about 14 km from Dehra Dun city, weight 2.8 kg and length 80 cm (approx.), the snake was trapped as being dangerous for local people and released in the forest, after making observations by 2nd author; another one sighting on 23rd February, 2018, by same author; 1st author also has information on its frequent occurrence in and around the area.



Daboia russelii, Russell's Viper {Courtesy : Vetu Negi, Guide}

Field Identification: Characteristic almond-shaped or rounded large ring-like spots with inner black and whitish outer margin in three rows on upper brownish body length, central row chain-like.

Description:

Body: Robust, stoutly built and slender snake; tail short, about 14% of total length.

Head: Head flattened, triangular and distinct from neck; snout blunt, rounded and raised; paired canthus rostralis distinct; nostrils very large, each in middle of a large nasal scale, eye large with vertical pupil.

Lepidosis:

Body: Dorsal scales strongly keeled and dry-looking, except outer row of smooth scales, in 25-29: 27-33: 21-23 rows; ventrals broad, 153-180, anal entire; sub-caudals paired, 41-64 (Whitaker & Captain, 2008; Sharma et al., Indiansnakes.org). Subcaudals 41-68 (Mallow et al., 2003).

Head: Crown of head covered with small, imbricate and strongly keeled scales; lower edge of nasal touching naso-rostral; supra-nasals crescent-shaped, separating nasal from naso-rostral in front; rostral as broad as high; supra-labials 10-12 (4th and 5th significantly larger); eyes surrounded by 10-15 circum-orbital scales and separated from supra-labials by 3-4 rows of sub-oculars; two pairs of chin-shields, front pair notably enlarged; supra-ocular scales narrow, single and separated by 6-9 scales across head.

Colouration: Ground colour variable (brown, yellowish-brown, dark greyish-brown, reddish, orange, tan or entirely grey occasionally) with three longitudinal series of prominent, large, dark brown or black oval (almond-like) or rounded spots which run throughout body length, spots may be with pointed ends, have narrow black and outer white/creamy/yellow margin, may meet to form a chain-like pattern, mid-dorsal spots, numbering 23-37 are joint, in chain-like pattern while side spots break apart, spots start from head and generally become faint or absent on tail region, side spots smaller and more rounded than and may be discontinuous; head with a pair of distinct dark brown patches, one on each temple and a lighter one in front and with narrow whitish/pinkish/brownish inverted V-shaped marking; two dark irregular streaks, outlined in white or pink, behind and below eyes; a dark stripe between eyes; lips scales mottled with brown; underside of body may be whitish, yellowish or pinkish, often speckled with dark brown or blackish irregular or crescent spots on edge of most ventral scales, underside of tail comparatively darker with brown or yellow. Colouration may sometimes. Colour and pattern may become faint with age and sometimes without characteristic pattern.



Daboia russelii, Russell's Viper {Courtesy : Dr. Pratyush Mohapatra, Zoological Survey of India}

Length: 1.24 m (tail 18 cm), girth 15 cm, head length and width 5 cm each (Ditmars, 1937); 2 m, female shorter (Husain & Tilak, 1995); adult 1 m, maximum 1.8 m and at birth 24 cm (Whitaker & Captain, 2008; Sharma et al., Indiansnakes.org); 1.66 m, minimum total length of gravid female about 1m, average about 1.20 m, juveniles 21.5-26.0 cm (Wikipedia); 80 cm approx. (present).

Altitudinal Occurrence: Plain to 2,743 m/9,000 ft (Waltner, 1975); 2,756 m/9,040 ft (Whitaker & Captain, 2008); up to 1,500 m (Reptile Database); plains and moderate elevation up to approximately 1,463 m/4,800 ft, more common in plains (Sharma et al., Indiansnakes.org); plains and low altitudes up to 2,300-3,000 m/7,500-9,800 ft in Himalaya (Wikipedia).

Distribution:

Sahastradhara: Nagal village area (new record).

Elsewhere in Dehra Dun: Dehra Dun (Husain & Ray, 1995), Forest Research Institute Campus (Dhalve, 2013).

Elsewhere in Uttarakhand: Pauri, Almora, Nainital and Pithoragarh; Rajaji Tiger Reserve; Corbett Tiger Reserve.

Elsewhere in India: Andhra Pradesh, Assam, Bihar, Chhattisgarh, Daman & Diu, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Puducherry, Punjab, Tamil Nadu, Telangana, Uttar Pradesh and West Bengal.

Outside India: Bangladesh, Bhutan, Myanmar, Nepal, Pakistan, Sri Lanka and Thailand.



Daboia russellii, Russell's Viper {Courtesy : Dr. Pratyush Mohapatra, Zoological Survey of India}

Habitat: Open grassy or bushy patches, scrub jungles/lands with low bushes, forest edges, forest plantations, variety of forests (rainforest, mixed, dry moist deciduous), grassland, open dry lands, open country, wetlands, farmlands, agriculture/paddy fields, dense thorny hedge rows, termite mounds and rocky hillocks.

Food & Feeding: Rodents (rats, mice, squirrels), shrews, birds, lizards, frogs/toads and also land crabs, scorpions and other arthropods. Juveniles are generally crepuscular as feed in twilight (during dawn or dusk).

Breeding: Ovoviviparous, mate early in the year to beginning of summer and young ones, 20-40 in single litter (fewer 6, even one and up to 75/96 as per the records), are produced during may-November after gestation period of more than six months. However, in large clutch many juveniles don't survive and die due to developmental problems during gestation period and if born normal then for lack of proper food and care.

Behaviour: Primarily nocturnal but may become day active/basking during winters. Adults are generally slow and sluggish on movement but on irritation or threat become very aggressive and incredibly strike fast or creep in somewhat jumpy manner. On threatening or in danger they make a plate like rounded coil with raised head at centre and produce whistle-like sound to alarm its enemy but further disturbance may attack to scratch body of enemy and may or may not its venom.



Daboia russellii, Russell's Viper {Courtesy : Dr. Pratyush Mohapatra, Zoological Survey of India}

Conservation Status: The Wildlife (Protection) Act, 1972: Schedule II.

Threats: Killings for fear of biting, accidental road killings, venom trade, skin and other purposes.

Venom, Bite-symptoms and Treatment: Fangs 16.5 mm long in average length specimen. Adults generally emit good amount of venom, ranging mostly from 130 to 268 mg (rarely 21 mg) and juveniles 8-79 mg, the lethal dose is about 40-70 mg. The venom is haemotoxic in property and is considered one-third as toxic as that of Cobra but large-sized fangs contribute the severity of its bite. The venom affects the vasomotor centre and destroys the red blood corpuscles and the line of blood vessels, leading to extensive internal bleeding due to reduction in coagulating property of the blood. The effect of the venom produces convulsions in the body and retards respiration and hence the bite must be treated immediately with anti-venom serum, the polyvalent antivenin, used to treat bites from this snake. It is suggested here that early medical treatment with relevant anti-venom be provided to the victim for reducing the chance of developing the severe or potentially lethal complications.

Remarks: As regards spelling of the species, *D. russellii*, Zhao & Adler (1993) considered *russellii* but McDiarmid et al. (1999) favoured *russelli* on the basis of Article 32c(ii) of International Code of Zoological Nomenclature which appear justified.

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Akhlaq Husain, Former Scientist-E/Joint Director, Zoological Survey of India, having vast field and research experience since 1964 (still continuing on his own), on various animal groups with good number of publications in journals/books of repute, higher research guide leading to Ph.D., Environmental Impact Assessment studies, member editorial board of various Journals, review of scientific papers from India and abroad and teaching. Described many new fish species, adding to science. Attended various seminars/symposia. Participated in Antarctic Expedition for zoological studies. Worked on Mauritius and Arabian fauna also. Awards: Merit Promotion at Zoological Survey of India and 'Special Honour' for scientific studies at Antarctica and 'Appreciation Certificate' for outstanding achievement by Vice Chancellor, Aligarh Muslim University.



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THE WILD BUFFALO : AMONGST THE BIG FIVE IN INDIA

Prakash Singh

Kursela, District Katihar, Bihar

Over the centuries, the primeval wonderground of our planet, fragmented mainly by the Continental Drift, has formed the wild life habitat of different animal and plant species. The Buffalo, in the wild, has come to be known today, whenever and whatever form it exists in, by different names. Laymen, as are most of us, call them in their various manifestations by variations of what they are locally known as 'Arnaa/Janglee Bhainsa'.

Descended from the top-soil beds of the black-rock granite of Gondwanaland, this animal, solid and tenacious through most evolutionary vicissitudes, has survived : be it the African Buffalo and the Cape Buffalo, the distant American Bison, the Indian "Boo Gauras" Buffalo, often referred to as the Indian "Gaur" Bison, the "Wild" Buffalo, dealt with here, the country-bred and domesticated Water Buffalo, hybrid strains of the milch-Buffalo and the South-East Asian Swamp Buffalo. Time, and its ubiquitous conflicts, have left their mark on the Buffalo, in the wild and in captivity; despite impending oblivion, the depression from the hooves of their wild strains continue to the embedded on the forest floor, in the remote fastnesses where they exist.

Perhaps the closest in class to the primeval herd, the Great Indian Wild Buffalo, known since ancient times as the "Aranya" or, locally, as the "Arnaa" Bhaisa literally, the Wild Forest Buffalo, deserves to be better known to posterity. One of the reasons for writing about it is to draw attention to the obvious fact that changed habitat and depleted natural nourishment from vanishing flora, have brought about a reduction in the size of its original proportions. Its threatened extinction, despite conservation and care, lurks on the horizon.



Photographs, included here, have been done so with the express purpose of giving readers an idea of the Wild Buffalo's magnificent appearance and also of the texture of its natural range whose extent ran the length and breadth of major riverine tracts, with their sands swamps, hillocks and uplands, Elephant, or Tiger, grass abounded. This unique eco-system of the wide spread Gangetic Basin that geographically inter-connects beyond political boundaries, specially in our context, with the North-East, the East and South-East of India and further, was ideally suited to this unique and formidable wild animal. The impressions of a young English military officer, about the Wild Buffalo's true habitat, around the year 1803 A.D., are worth taking note of. Published as a descriptive diary of events and adventures met with by the East India Company's Lieutenant and called "War and Sport", it depicts, in one section, the jungles on the north banks of the Ganga-Kosi Confluence, as an impenetrable green mass of bush and foliage, overwhelmed with girdling, vast liana-like creepers and climbers that often covered the undergrowth on the clayey banks, festooning the small and big trees that had grown, surviving the unrelenting conditions of the flood plains.

The river Kosi known by this one name, is composed of seven Himalayan rivers of unprecedented turbulence. In his memoirs of 1803 A.D., the British officer, remarks that it was an area he was glad to be sailing past, instead of dis-embarking and finding sport in likely wild life haunts by the river side, as he was wont to. Evidently it was an extra-ordinarily eventful sporting sailing trip down the mighty Ganges, specially in its lower courses, for at the nearest halt down from the Kosi-Ganges Confluence, he was, evidently, invited ashore to view the pugmarks or hoof prints in a swampy location, that the Lieutenant Says, the 'locals, said belonged to a "Monster". Clearly the nature of the jungle mass, near the confluence and the sportsmen's clearly avoiding the area, is a silent tribute to the area inland, that was the stomping grounds of the Wild Buffalo.

Nothing is the same anymore in this very region. Our imagination, and the facts tell us of the manner of the Wild Buffalo females and their calves, that once browsed through these seasonally available



pastures lay cleared of the obstructing wall of savage flora, as if for their use, by the rampaging flood craters. In overtopping the banks, the flood strews, till today, a tracery of channels eroded by its pressure, with deep swathes of incredibly fine, sparkling white hills and vales of sand from many a river bed. These devious, deceptively benign, turbid waters of the grand rivers lower course, once provided cool wallows for nursing wild buffalo females and their oversized spry calves. Their overload, the night-black mammoth Wild Buffalo Bull, must, once, have bodily forded through the sandy-slick, man-killing quick mud, on its way to find cool companionship with a chosen female, that then would, lead it into the gently swirling clear river currents: mythical and ambrosial waters pouring down from the planets' greatest and the youngest mountain range! Its magnificent spread of horns, perhaps eight to ten feet from one tip to the other, trailed with entangled springs of succulent bracken collected on its passage through the tall grass where they spring up in the sand with miraculous swiftness. The Buffalo bull's horns would swing into the water as it sank its massive girth into the river and settled alongside the wallowing wild herd, on some bygone day.

The largest tigers in the sub-continent, the Royal Bengal of legends, were found to come prowling from denser surroundings and their own regular habitat in the wilderness downstream from where the great Wild Buffalo herds were naturally located. These tigers, as hunting records state, were to be found in the drier, overgrown uncultivated jungle lands, a mere dozen miles northwards of the vast Ganges-Kosi confluence's wilderness, with their immense stretches of trackless, tall Elephant Grass, beside the conjoined river as it curved, bending South-Eastwards, away from the great "Terai" forest and revamps, to flow willfully towards the mouths of the Ganges in the ocean delta of the Bay of Bengal.

The Wild Buffalo is known to knockdown a mounted elephant by rushing in and hooking balancing the greater weight of the towering pachyderm on the spread of its stout horns from below and bulldozing the elephant off balance thus knocking it onto its side, old fashioned howdah, heavily armed 'Shikaris' and all ! By putting their formidable horns together, Wild Buffalo females could keep a rapacious tiger away from their helpless young. It is a recorded, well known fact with wild life enthusiasts, hunters and naturalists, that the king of the Indian Jungle gave the wild bull Buffalo and its cold-blooded strength, a very wide berth indeed !



Yet, the Wild Buffalo was evidently, at times, a gentle giant, as legends, popular amongst riverside dwellers, tell. Females would mingle and browse with domesticated milch buffalo herds, as population pressure mounted with the advent of political freedom to the rural wilderness that were the semi-urban settlements of the future. Hunted, during and between the two great world wars, for their outstanding, eye-catching fierce horns coveted as trophies, and later ousted from their pastoral ranges by the uncontrollable spread of marginal farms, popularized by ever increasing swarms of opportunistic settlers most Wild Buffalo Bulls “put their backs together” as the saying goes, “and migrated”. Despite topography and suitable flood plains existing today, along with the magically quick jungles, that sprung up on riverside alluvial fans, the Wild Buffalo have forever gone, never to return to their home grounds till hit-and-run forming techniques unleashed by greedy criminals and land-grabbing faceless desperados, continue to destroy the pristine habitat of the glorious animal hunted by inexplicable fate.

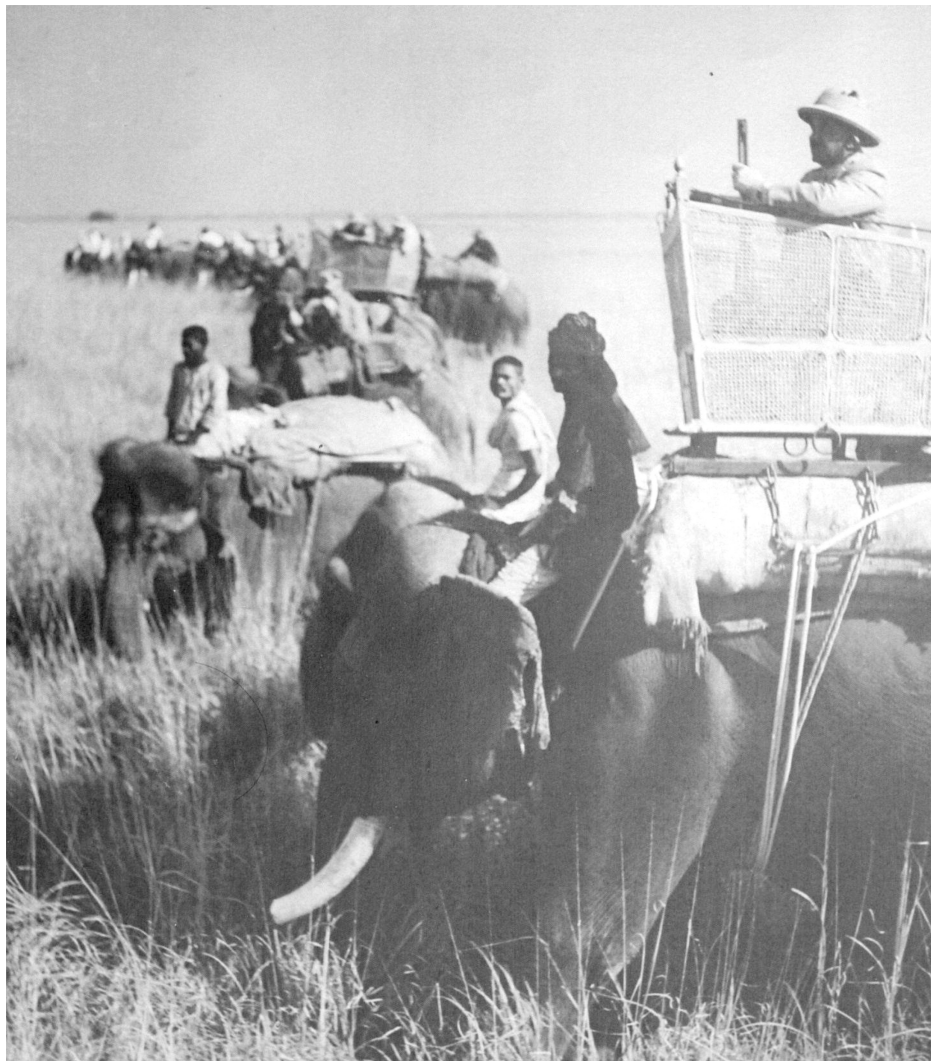
Yet, some are found in the Central Indian forest preserves, notably Pench and its surroundings. Most went migrating to the North-East to Kaziranga. Similar wild strain known the same colloquial name, had existed, earlier in a similar habitat. A variant of the Wild Buffalo, and very often, the Wild Buffalo as we know of it, too, is referred to as the 'Mithoon' in the North-East.

Thank God, the Wild Buffalo is not lost to sight in, this age where, the grim statistics for, daily vanishing species are mind-numbing. Our descendants, and the future, will really be the richer for their continuing existence. It is no wonder that Goldsmith, another, more modern English Army man who hunted for sport amongst his duties, in the North-East, in his book written in the mid-last century published under the title “Tigerland” and describes a truly graphic walk along a wild part on the banks of a river flowing through the jungle that he was hunting in where he emerged onto the high bank of the wide stream and to find a strange wild brush, sprouting upwards out of the river, close together, but despite their distinctly



strange regularity, yet uncannily spaced out in the shimmering, mid day river currents, till the far side ! As the Colonel stood looking at the strange, angulated dry branches jutting out from the middle of the flowing channel, he got the shock of his life to see the entire growth of those stems in the river, lift up and turn, as if one solid mass in his direction, for, they were the widely extended, pointed horns of a grouped herd of Wild Buffalo lying submerged, resting in the sweltering jungle afternoon like an overgrown island of undergrowth in the flowing river.

It was a sight to see indeed, that if we but try to restore grandeur of it's the habitat to the cornered animal, might very well, be seen again.



About the Author :



Mr. Prakash Singh is a nature lover. He did his schooling from St. Xavier, Patna, and college from Delhi University. Being inclined towards creative writing, specially poetry, he took to composing stories in which his deepest impressions were those gleaned from beautiful, bountiful Nature-human floral and faunal. Living in his country estate of Kursela in Katerish district of Bihar, India. He has authored a biographical novel on 'Tiger Shikar' called "The Wildest Sport of All" published by Harper Collins in 2015.

LIONS

Prakash Gariya

LIONS

The lion (*Panthera Leo*) is the second largest of big cats after Tiger. Males are larger than females and have a prominent mane. Males weigh around 250 kgs while females has weight of around 150-180 kgs. Lions are Highly social creatures and live in prides which may have as many as 20 or more lions before that split for survival and food. Pride is the real strength of lions which puts them into the top of the food chain. Hunting is primarily done by females but dominant lions do take part in hunting of bigger preys like giraffes, buffalos and elephants. They mate thought the year and have a gestation of around 3 months. Male cubs are forced out of the pride by dominant males lions when they reach the age of 2 and a half years to 3 years. This is the nature's way of avoiding in breeding. it is interesting to note that despite being top predators, lions do scavenge and almost 40% of their foods comes from scavenging.



HYENA: PREDATOR OF SCAVENGER

Hyena are doglike carnivores found all around african savannahs and known for their scavenging habits. In contrast to their notorious reputation as a scavenger, hyenas are expert hunters. As much as 70% of their foods comes from hunting. They live in clans headed by an alfa female. Females are bigger than males with males having no social status in respective clans except breeding. Hyenas weigh between 60-80 kgs in weight and have very strong jaws and one of the most powerful bites of around 1200 PSI (pounds per square inch) which is 10 times stronger than humans.



AFRICAN ELEPHANTS

The African elephant is the largest animal walking on the earth. Elephants use their trunks for communication and handling things, ears are used to cool their body temperature by fanning. They live in herds and follow strict social order. A herd is headed by Matriarch. Survival of the herd depends on the wisdom of the matriarch. Elephants are highly endangered because of poaching for their tusks. Elephants are highly protective of their young ones. Adult male elephants are solitary and mingle with the herd for breeding only.



Great Indian Bustard (*Ardeotis nigriceps*)

Col Gaurav Kamboj

Dilaram Bazar, Dehra Dun, Uttarakhand

This April when I travelled to Jaisalmer district of Rajasthan, for my official work, I had no intuition that a chance encounter with a great Bird, will once again rekindle my passion for wild life, especially Birding.

As I was travelling from Jodhpur Airport towards my destination, my vehicle broke down & here is where Lady Luck played a role. I met a passionate Forest Guard, from Vishnoi community of neighbouring village. I enquired about the Great Indian Bustard (GIB) from him & after initial hesitation; he became my guide and main source of motivation to rejuvenate my passion again. This person is carrying out a wonderful selfless service, in the Govt of Rajasthan initiative of conservation of the critically endangered GIB. He is not only involved in sighting & census effort of this Bird, but is directly involved in creating Enclosure – the safe breeding habitats in that area.

As I proceeded to two different areas on two consecutive days, ie, 17 April & 18 April (my Birthday), little did I realise that wishes of my friends will make me so lucky to have nine sightings of these beautiful magnificent creatures of Nature.

The Great Indian Bustard (*Ardeotis nigriceps*) is a bustard found in some regions of India and Pakistan. A large bird with long bare legs, similar to Peahen/ Ostrich, is one of the heaviest flying birds. The habitat where it is most often found is arid and semi-arid grasslands, open country with thorn scrub / tall grass, semi deserts and it avoids irrigated areas. The Birds as of now are in critically endangered category and as per latest estimates of Wild Life Institute of India, less than 200 are left in the world.

The Great Indian Bustard can easily be distinguished by its large size (92-122cm), has greyish/ white neck, black crown and crest, conspicuous black crown on the forehead. The body has uniform brownish upper parts white-spotted black wing coverts. The monsoon is the Breeding season, when females lay a single egg in open areas, prone to threat by Wild Boars/ Dogs and other animals in the Habitat. Although males are supposed to play no role in the incubation and care of the young (which remain with the mother till the next breeding season) but as per my Guide, as observed by him, the male also take care (?) of eggs, if females are away. The diet consists of grass/scrubs/tree seeds; insects like grasshoppers and beetles, and sometimes even small rodents and reptiles.

Although efforts are visibly on by Govt of Rajasthan and Wild life Institute of India in conservation of this beautiful Bird, but we need a concerted effort from all wild life enthusiasts, Bird lovers and people from all walks of life to come together, to save another species from getting extinct from the face of the world.



HABITAT



IN FLIGHT

**MALE****FEMALE****About the Author :**

Col Gaurav Kamboj did his schooling from St. Joseph's Academy, Dehra Dun and College from DAV(PG) College Dehra Dun. In addition to two M.Sc, he is also a Gold Medallist, Honours Diploma in System Management from NIIT. The officer has performed exceedingly well in all the mandatory courses and has got 'Instructor' grading in Combat Engineering Course, Long Gunnery Staff Course, Junior Command Course and Senior Command Course. The officer has got 'Alpha' grading in Technical Staff Officer's Course and was nominated as reserve for prestigious Higher Command Course. The officer has also been a Instructor in College of Military Engineering, Pune and a Senior Instructor in Young Officer's Division in School of Artillery, Deolali. Presently, he is a Senior Level Executive in Defence Services and a Budding amateur Birder (interest in Ornithology) with a passion for Wildlife Photography.

OF FUR AND OF FEATHER

Mathen 'Rajeev' Mathew

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Many are the times when the wild bug bites. The itch too great to resist and this causes many to get out of the urban chaos and curl into the lap of the wild. Excitement is the key word, for, how else can be described this unusual urge to set out on a trip into the wilderness. The drive to some spot that offers a hope of seeing something wild; be they of fur or of feather.

Ofentimes, it also entails a visit with a rod, reel and line to match strength and cunning with a hidden and sporting adversary with scales; which scales more than the hook, line and sinker that, when presented in a most artistic manner takes it and then makes a dash, while burning furrows in the fingers as the line plays out and the reel sings a merry tune of strain and excitement. The exhilaration as the rod bends from a ramrod to a tapered 'U' has to be experienced to believe.

Fur entices more than feather; especially if the furry one is the striped King of beasts, whose calls send a cold shiver down the spine, whose supple grace, regal bearings and prowess are tales of truth and of legends. Closely followed is the spotted Prince (Leopard), he has not earned his stripes yet, but is very handsome, climbs trees, is very nimble footed and a master at camouflage.



The Lords are the trunked ones, sporting ivory flamboyantly and blow their own trumpets. They love the water and snorkel and gambol in it for hours. They are the gardeners; they prune trees, mow the great lawns and plant new trees and bushes. The Lordlings, for some time wonder where their noses have gone and find the hosepipes attached to their snouts most annoying.

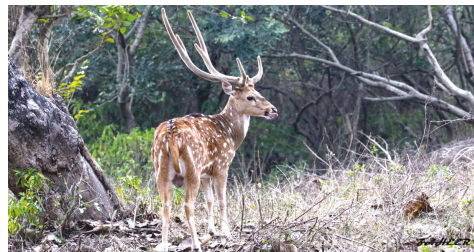


The powerhouses are the beautifully curved horned, pitch black, white stocking-ed, black shod, men in black, while the ladies are elegantly dressed in brown leather tights. They are the bulkily graceful fat of these lands who always stare bewildered wide-eyed at the world.

The doe eyed beauties with white dappled fawn coats; their masters similarly liveried, and sporting beautifully curved and



polished sabres disguised as branches stand out as jewels in the emerald green glades. The glens are ranged by their somber coloured larger cousins, chocolate brown, walnut tine crowned, regal headed, sure footed, deep bellowers.



The bright eyed, bushy tailed red racers, whistling and winking as they gambol and play, their large ears ready to pick up all that is to be heard in their country, eternal nomads, very restless spirits of the forests (Dhole/Red Wild Dogs). Their cousins sing to the Moon, and steal from the King and the Prince; by whose antics most are fooled to the advantage of the howler.

The bone crusher lopes about his business, forequarters powerful, hindquarters weak, heavy jawed, dirty white, bedraggled, striped coated; an undertaker; but he laughs; for, he who laughs last, laughs best!

The Crested, large taloned, dark backed, spotted chested stooper, the buoyant flier; the downy feathered killer rides the wind in circles with no purpose at hand, but still purposeful; who folds into nerve wracking nose dives and scares the wits out of the beholders.



The grandiose fan of the mover and shaker to impress the somber beauties around; dazzling them with Argus eyes and rainbow colours, and, glistening in jewels befitting a queen.

Bejewelled little down-curved billed royal purple scintilla, some also with deep lemon breasts; they sip liquid gold daintily from the fragrant and nubile flowers.



The grandiloquent green flashes mingling with the leaves; ventriloquists, some fruit headed, others necklaced, some hanging upside down, while all kiss and make up with their curvaceous bills.



'Did you do it?' and 'Why did you do it?' cries the leggy, yellow legged, black and white, brown coated red faced whistle blower; while his pale, yellow faced cousin meekly rejoins 'Why?', 'Why?'



The mighty massive headed, large scaled King of the waters, sometimes auric, sometimes argentine, live in the fastest gin-clear tumbling waters shot through with a million fine bubbles on the rocks; which as Champagne, go to the head!

The big mouthed, stiff upper lip-less-ed, dour, deep-bodied, crimson fringed, silver ingots wander the waters, sucking the slime and clearing the waters for racy swimmers.

Snake-headed, top-beady-eyed; the black apparitions suddenly shoot up to take a gulp of air, they have the best of both worlds, they drink and breathe at the same time.

The knife edged silver cleavers, hunch backed, lean bellied and extremely flat chested many toothed, small mouthed nippers gambol and flash as they roll and boil the waters in mirth.

Such sights and sounds, of mad rushes and stern moods, of the roarer, of the bellow and of the screamer; the headlong dives and the native song and dance caused to be seen and heard by a bug that bites is the panacea of life to be lived under the watchful eye of Faunus.

I have spoken ought of the creepy crawlies, of boughs and of vines, for I know naught of them, and may not take too kindly if I describe them false.

About the Author :



Mathen 'Rajeev' Mathew is Wildlife consultant and his core is working and alleviating human animal conflicts, livelihoods and eco-restoration. He also is an R&D consultant for Tac Sim. He was a field Biologist with the Bom. Nat Hist. Soc. Later he was also the Hon. Treasurer of the Rowing Federation of India. He was an Expert Member of the combined state of AP and Telangana (Andhra Pradesh). He is an Expert member of the Telangana State Biodiversity board, he was also an Expert Member of the National Biodiversity Authority constituted for Red Sanders. He was also an expert knowledge partner with centre for Innovations in public systems, Hyderabad, (CIPS) for "Developing" a comprehensive greening policy for Andhra Pradesh.

About the Photographer :



Photos by Mr Zaheer Bakshi

HARVESTING AND MARKETING OF FISH IN KHERI DISTRICT OF UP

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ABSTRACT

Harvesting of fish from ponds is done when they reach marketable size or when there is a market demand for them on some festive occasions. The present paper describes the complete methodology for harvesting and marketing of various fishes produced from seasonal ponds in KHERI district of UP.

Key Words:

Harvesting, Marketing, Seining, Use flows

INTRODUCTION

Harvesting of fish from ponds is done when they reach marketable size or when there is a market demand for them on some festive occasions. In seasonal ponds where water is reused only for 5-6 months and ponds start drying from January onwards or in case where the pond is prone to serious flooding or there is a drought, complete harvesting of fish is to be done before the water level in ponds goes down sufficiently and then the produce should be immediately marketed.

2. HARVESTING IN UNDRAINABLE PONDS

Seining is a convenient method to harvest fish from undrainable ponds, when for economic reason or in the absence of any nearby water source ponds cannot be drained out. All fishes cannot be caught by means of a net. Only catla, silver carp and rohu can be caught in bulk, but these fishes can jump out of the net. Mrigal and calbasu and also common carp are difficult to be caught as they can escape the net by burrowing into the bottom mud. Generally, seining in Kheri district is done with a net which is spread across the pond.

When the net is operated and dragged from deeper part of the pond to the shallower side, a sack is formed in the central portion of the seine, which is further increased by making the central portion of the net deeper.

The mesh size of the net is adjusted according to the size of the fish to be caught. Nets with large mesh are lighter per unit length and therefore they can be easily dragged.

It has been observed that about 80-90% of the surface feeders (eg. silver carp, catla, etc.) and column feeder (eg. rohu) can be caught by means of drag net, but only 10-30% bottom feeders such as mrigal, common carp, calbasu etc. are caught.

Sometimes draining of the pond is combined with seining in case if there is a large stock of fish. In shallow or medium sized ponds, a greater number of fishes can be caught by a net if the water level is reduced and some artificial feed is broadcast near the shallowest portion of the pond prior to the start of the nesting. Fish will congregate there and can be caught in large number by dragging the net from the opposite end. After the fishes have been harvested by means of seining, still some bottom dwellers eg. common carp

and mrigal will remain in the pond. The pond is then poisoned by means of mahua oilcake (*Bassia latifolia*) or bleaching powder. Now there is common tradition to use bleaching powder.

3. HANDLING, PRESERVATION AND TRANSPORT

In polyculture system the fish is to be sorted out species-wise and sometimes graded into different size groups within species. Sorting is to be done manually. The more sensitive fish like silver carp, if to be restocked are often sorted out from the net itself and then transported either to the separate holding ponds with an adequate supply of clean water or are loaded directly into the transportation tank. Live and healthy fishes are sorted out for transport. Hardier fishes such as common carp, Indian major carps, grass carp, etc. are sorted out inside the net or at the packing center. During the process of sorting out before transport, fishes are given a bath of potassium permanganate solution (1 ppm) and then transported in clean, cool fresh water. Sometimes all fishes collected from the net are loaded into one transportation tank, brought quickly to the central sorting and packing place and sorted out.

4. MARKETING

The success and failure of the aquaculture industry depends largely on the product marketing of any production system. In such a production system marketing assumes relatively a greater importance because of the highly perishable nature of the fish. In aquaculture marketing sale of fish seed including spawn, fry, fingerlings and juveniles is involved, but here we shall consider only the marketing of the consumable fish.

Aquaculture production system may be a very highly intensive type or small scale familial aquaculture. The fish produced through small-scale system is generally consumed fresh locally whereas that produced through large-scale farming is to be disposed in distant, domestic or export markets. Preservation and processing of products, long distance transport and a variety to retail outlets are also involved. Fish can be sold in live or fresh condition.

4.1 MARKET POTENTIAL

For successful planning of marketing it is essential to know the market potential of the product. For investigating the market potential of a nation-wide aquaculture development programme, detailed market research is to be conducted on –

- ♦ The food consumption and dietary habits of the importing countries satisfied socio-economically (income based),
- ♦ Consumption patterns of aquaculture products in different groups and areas and their importance in local diets,
- ♦ Determination of the quality of fish required through capture fisheries production to meet the project demand,
- ♦ Market trends in the importing countries and extent of consumption, product quality regulation and exchange rates and
- ♦ Assessment of the acceptability and demand of a non-indigenous species as compared to the consumer's attitude towards the local species of comparable qualities and its sale price in the local market.

All the above studies are based on proper knowledge of consumer's preference, attitude and consumption pattern, if no previous information is available. The consumer could be broadly grouped into –

- ♦ House holders
- ♦ Restaurants
- ♦ Institutions (Shang, 1981) and industrial consumer's (Pillay, 1995).

For each groups stratified information is to be collected –

- ♦ Households – Socio-economic characteristics,
- ♦ Restaurants on the basis of their customers and classification of the standards and nature of the cuisine,
- ♦ Institutions according to their functions (such as hospitals, schools, children and old people/home etc),
- ♦ Socio-economic characteristics of the consumers using the products and those of the industrial consumers on the basis of their business,
- ♦ The quantity of the product or products purchased during a given time in the recent past,
- ♦ Buying and eating habits and consumers view of prices, quality and substitutes and
- ♦ Frequency of the repurchase of the products and intentions for future purchasing, so as to know the levels of satisfaction with the product (Pillay, 1995).

4.2 MARKET STRATEGIES

The present organization of the fish marketing is meant to meet the needs of a relatively small industry. But the expected expansion of the industry in future in the country, reappraisal of the existing market arrangement and the formulation of appropriate strategies is needed. There are many channels but a suitable model be adopted which will undertake coordinated distribution and marketing of the fish. Strategies may be evolved for various marketing system on an individual enterprises or national level, but the main thrust should be as to how satisfy consumer needs and tastes so that the economic viability of aquaculture operations could be improved in meeting the target.

CHANNELS

There are various channels through which fish reaches the consumers. The marketing system of fresh water fishes in India can be considered in terms of –

- ♦ Use flows,
- ♦ Physical flows,
- ♦ Channel flows and
- ♦ Fishermen/fish farmers realization from consumer.

(a) Use Flows

Freshwater fish obtained from inland resources is largely consumed in fresh condition. Ice is used to preserve its freshness as it is done elsewhere.

(b) Physical Flows

Due to eating habits and economic conditions of the people in area surrounding the fish production centers, fish is marketed to outside areas chiefly to urban centre in India. Kolkata is one of the main markets of consumers more than 10% of the freshwater fishes especially Indian major carps. Fishes caught from ponds and rivers are either consumed locally or sold at nearby production centre. However, the catches from the reservoirs are to be transported for consumption to urban centers, far away from production centers, because of the bulk production from the reservoir, high cost, poor local consumption and high demand and very high prices of fish at the outstations and distant places.

(c) Channel Flows

The following intermediaries are mainly involved in the channel flows of the freshwater fish.

- ♦ Wholesalers, commission agent-cum-wholesalers, pre-harvested contractors
- ♦ Commission agent (male)
- ♦ Cooperative society
- ♦ Retailer, worker-cum-retailer
- ♦ Vendor, worker-cum-vendor

The above intermediaries are involved in the marketing of fish from producers to the consumers. Fish flows take place through different channels, as shown in **Table 1** Fishermen/fish farmers may also sell fish to wholesalers directly or through commission agents at their own risk and retail intermediaries. Wholesalers sell to retail intermediaries either through commission agents or directly.

**Table- 1 : Pattern of flow of freshwater fish through various intermediaries
(modified from Srivastava et.al., 1985)**

Intermediaries	Channels	Remarks/Rank
I	F-R-C	Popular
II	F-V-C	
III	F-(WK+R)-C	
IV	F(WK+V)-C	
V	F-W-R-C	Very popular. About 30% of the total production handles.
VI	F-W-V-C	
VII	F-CA-R-C	
VIII	F-CA-V-C	Rank First
IX	F-PHC-R-C	
X	F-PHC-V-C	Last. About 0.24% fish produced handles
XI	F-(W+R)-C	
XII	F-W-OCA	Ranks third- about 9% fish produced handled
XIII	F-(W+CA)-OCA	
XIV	F-(CO+W+R)-C	
XV	F-CS-R-C	
XVI	Others	

F= Fishermen, C= Consumer, R= Retailer, V= Vendor, W= Wholesaler, WK+R= Worker-cum-retailer, WK+V= Worker-cum-vendor, PHC= Pre harvested contractor, CO+W+R= Contractor-cum-wholesaler-cum-retailer, CS= Cooperative society, CA= Commission agents, OCA= Outstation Commission agent, CW+A= Commission agent-cum-wholesaler, W+R= Wholesaler-cum-retailer.

4.3 PRODUCT QUALITY

Great attention needs to be paid to the product quality and presentation so as to establish lucrative business. The presentation of uniform-sized fresh or frozen fish could attract more consumers. Data can be collected on the preference of the customer to the species, its size, fish of required colour and quality. These data have formed the basis for decisions on product lines that should be developed.

4.4 MARKET PROMOTION

The product can be promoted in the market through various promotional activities. Advertising and personal selling are the best promotional activities directed towards customer communications as they have got long-term effect and also toward the sale of the product.

As regards the total fish arrivals in the city market in each month, recorded its maximum 85.2 quintals in December and the minimum of 25.2 quintals in the month of July. However, the total fish arrivals were recorded as 57.0q, 9.0q, 32.70q, 46.80q, 52.50q, 37.80q, 25.2q, 29.10q, 44.10q, 69.60q, 84.0q, and 85.2q respectively in the months January to December.

5. TREND IN THE FISHERIES OF DIFFERENT SPECIES

5.1- Carps

Indian major carps viz *Catla catla*, *Labeo rohita*, *Cirrhinus mrigala*, *Labeo calbasu*, *Tor tor*, *Labeo gonius* constituted 162.3q (49.4%) **FIG 1** and exotic carps (viz *Hypophthalmichthys molitrix*, *Cyprinus carpio*, *Ctenopharyngodon idella* and *Hypophthalmichthys nobilis*) **FIG 2** In the total fish arrivals Indian carps and exotic carps shared 24.8% and 25.5% respectively.

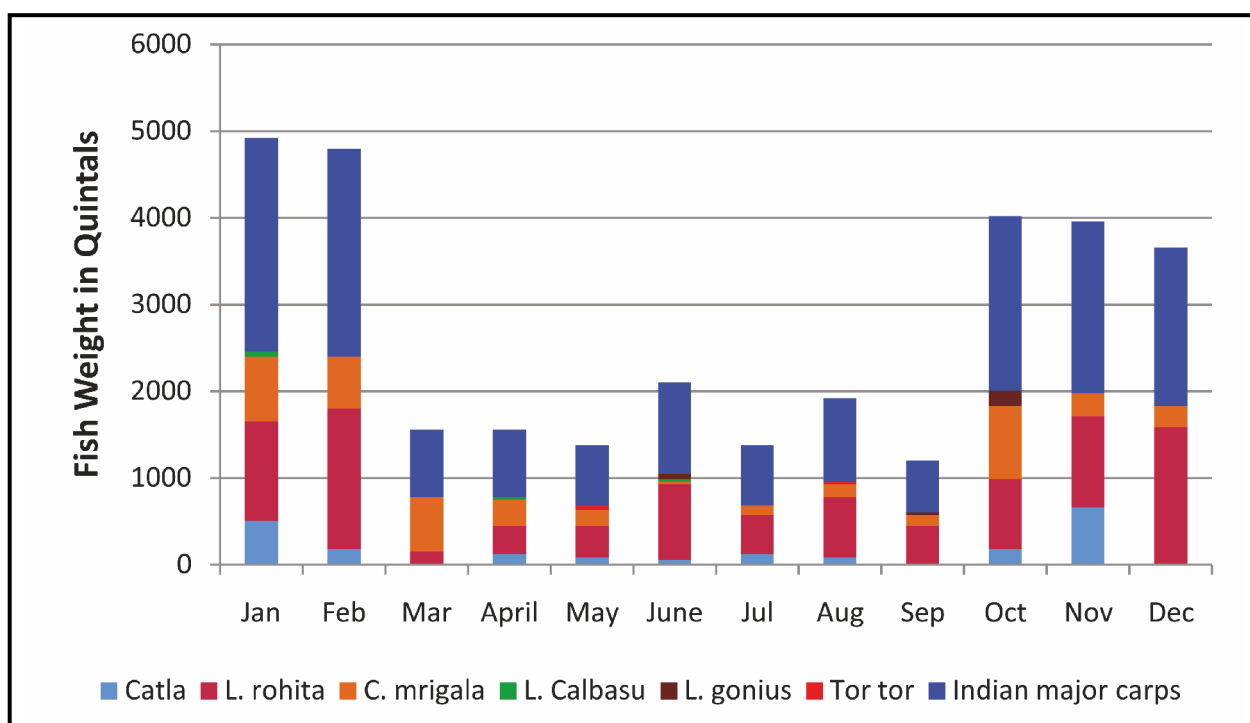


Fig- 1 : Monthly fluctuation in the species-wise total landings of Indian major carps

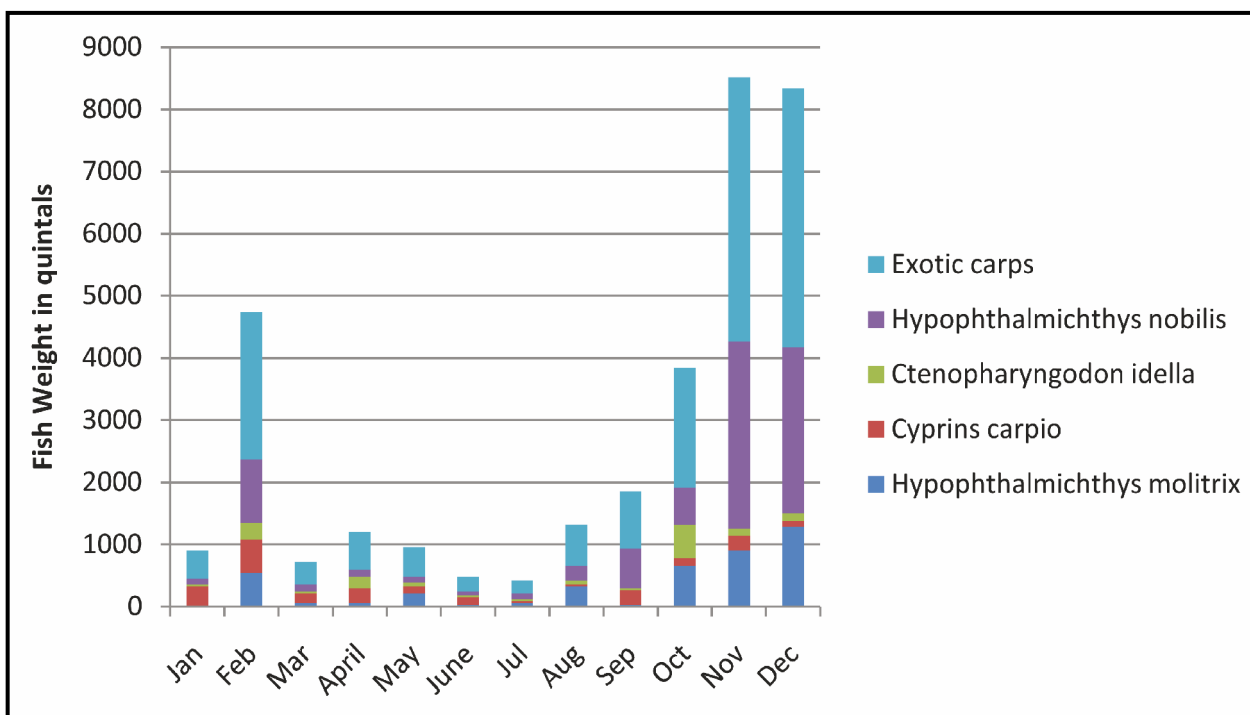


Fig - 2 : Monthly fluctuation in the species-wise total landings of exotic carps.

5.2 Cat fishes (Fig 3)

Cat fishes recorded 244.8 q and formed 37.4% of the total fish landing.

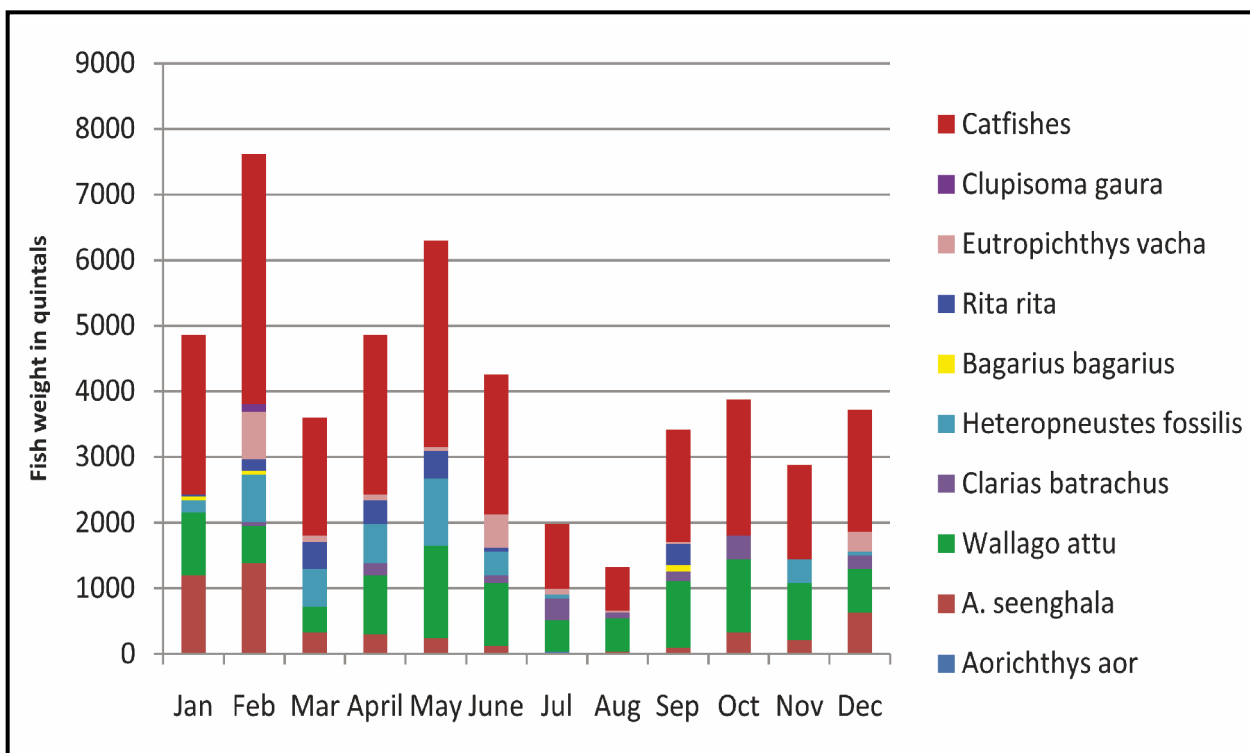


Fig - 3 : Monthly fluctuation in the species-wise total landings of various species under the group catfishes.

5.3 Murrels (Fig 4)

Murrels formed 7% of the total annual fish arrivals. Among the murrels *Channa punctatus* was the most common species. *Channa marulius* recorded 11.8% and 0.82% of the murrels and total fish landing respectively. *Channa striatus* shared 24.3% and 1.7% respectively of the murrels and total fish landings. It was abundant in the month of April and May. *Channa punctatus* contributed 53.8% and 4.5% of the murrels and total fish landings respectively. The fish occurred abundantly throughout the year, being maximum (6.3 q) in September and minimum (0.9 q) in February, July and December.

5.4 Others (Fig 5)

In the 'others' group, miscellaneous fishes were included. This group constituted 5.32% of the total annual market arrivals. Among the others *Notopterus notopterus* recorded 9.0 q, showing the maximum landings. Feather backs including *Notopterus chitala* and *Notopterus notopterus* together formed 15.3 q i.e. 44% and 2.3% of the others and total annual fish landing. *Anabas testudeneus*, *Puntius sophore* and *Mastomelabelus armatus* constituted 16.3%, 21.6% and 18.10% respectively of the total market landing.

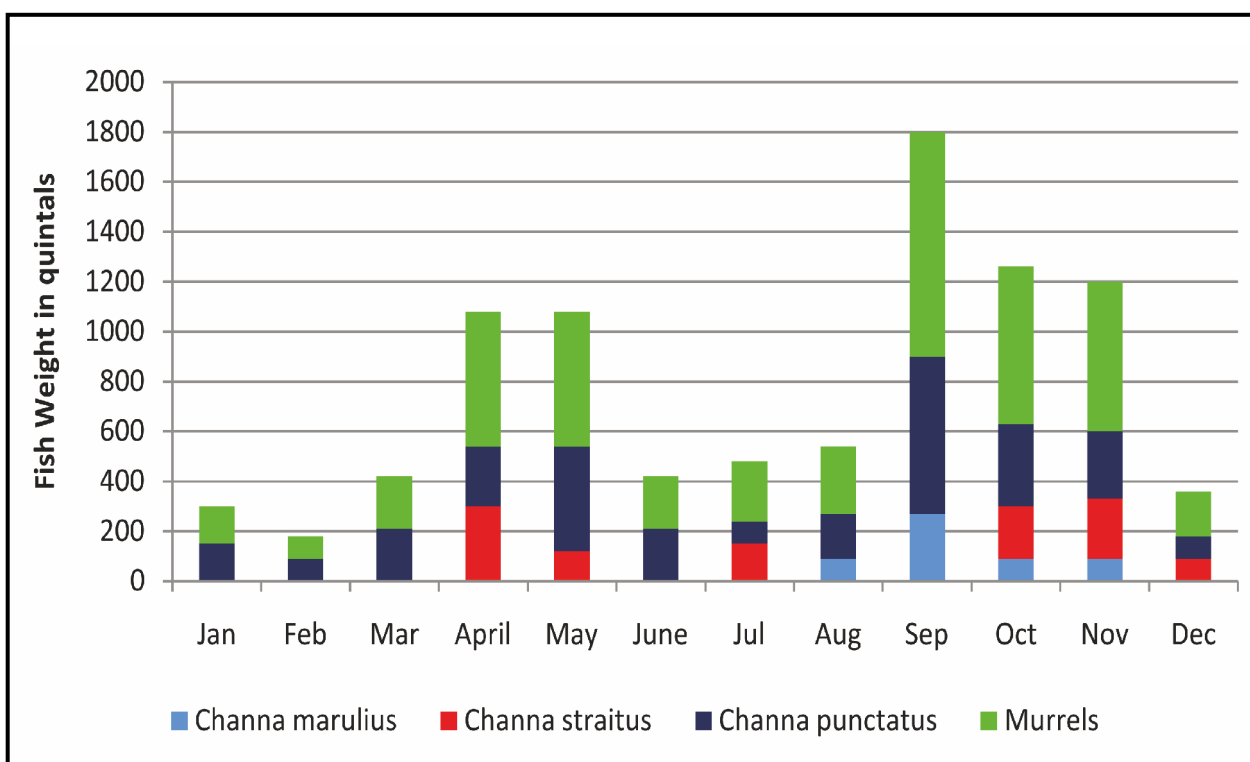


Fig- 4 : Monthly fluctuations in the species-wise total landings of Channa species under the group murrels.

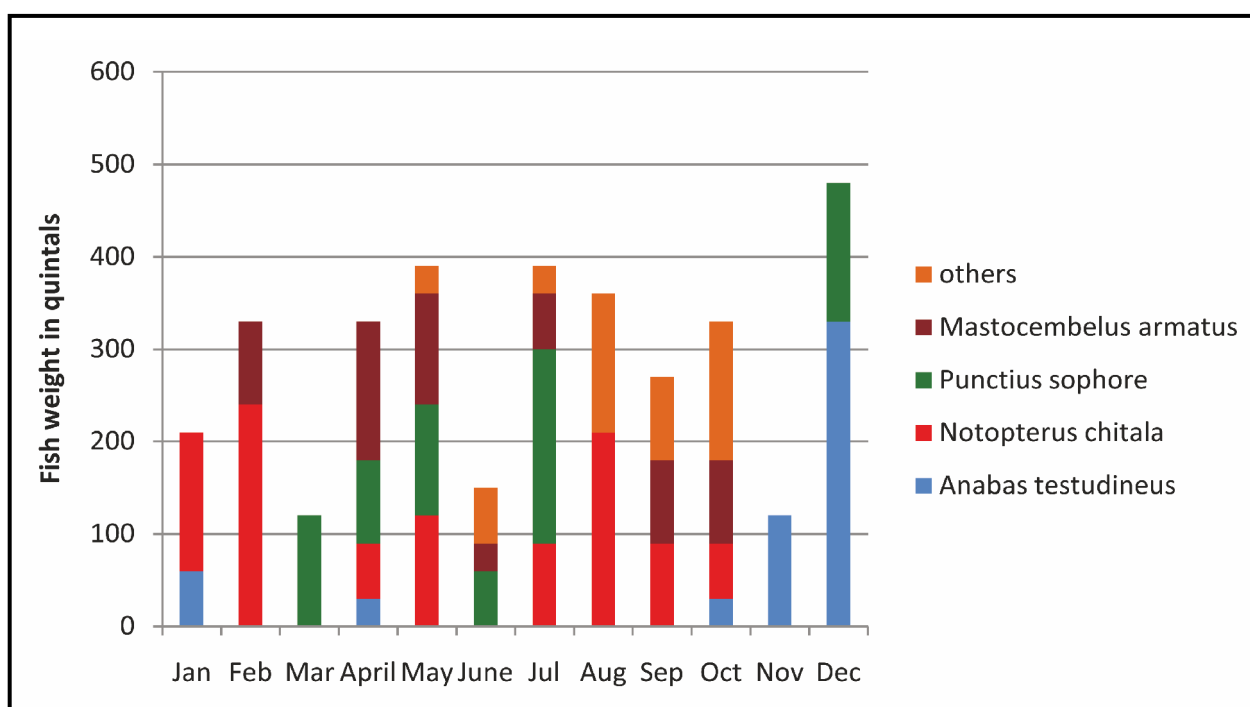


Fig- 5 : Monthly fluctuations in the species-wise total landings of fishes under other groups. fishes under other groups.

6. PRICING METHOD

There are several methods of price fixation being used. These are fixed amount per pound, fixed at pond by variety and weight, fixed price at market by variety and weight, auction at pond, auction at market and other methods used rather rarely.

In the district of Kheri Lakhimpur, the producer/owner always studies market fluctuations in the fresh water fish arrivals and the fixing of selling price fish depends –

- Demand of that particular species,
- Quantity of fish arrival in the market
- Weight and variety of fish, etc.

7. MARKETING CHANNELS AND PHYSICAL FLOW

The production of the goods is said to be incomplete until it reaches finally to consumers. However, commodities like freshwater fish do not have to be consumed directly. Since fish is one of the most perishable commodities, in spite of good progress in the preservation techniques and transportation networks direct delivery of the fish to the consumer is still prevalent and moves from place to place through several intermediaries and marketing channels.

In the district of Lakhimpur there are different major fish markets located at Palia, Gola Gokarannath, Dhakherwa and Lakhimpur city. In addition there are several local markets. At all the above markets fish is consumed fresh and there is no export. Also there is no wholesale marketing on the fish in the District Kheri Lakhimpur except Palia fish market, where the wholesale system of fish marketing is prevalent.

Based on the availability of fish and the marketing system prevalent in the city and various areas in the district the following flow channels were recognized in the district Kheri Lakhimpur and these are –

Table 2. Flow channels in the district Kheri Lakhimpur

Channel No.	Flow channel	Remark
I	F-R-C	Applicable at Lakhimpur II
II	F-V-C	city and elsewhere in the
III	F-(WK+R)-C	district except Palia fish
IV	F-(WK+V)-C	market
V	F-W-R-C	Applicable at Palia
VI	F-W-V-C	

However, the common channels through which farmed fish reaches consumers are :

Channel	(I)	F-R-C
	(II)	F-V-C
	(III)	F-(WK+R)-C
	(IV)	F-(WK+V)-C

At other markets i.e. Dhakherwa mand other local markets around the Sharda Barrage, fishes caught or purchased through auction at the fishing site are sold locally, keeping the sale price of fish slightly cheaper than what is prevalent at Lakhimpur city fish market.

There is as such no organized fish market. in the main market, where vegetables are sold, in a narrow lane occupied on both sides by various shops, fish retailers carry out their business on either side of the pavement. About 40 retailers occupy a small space on either side of the pavement in front of other shops and pay rupees two per day to municipal corporation and rupees then to the shop owner in front of whom fish retailer occupies a small space. Fish sale starts from 4 pm to 5:30 pm in winter and 4:30 pm to 6:30 pm in summer or till the customers start visiting fish market or till all fish are disposed off.

DISCUSSION

A survey of fish arrivals was conducted based on the information collected on the fish arrival and fishing practices prevalent in and around Lakhimpur Kheri. It was observed that, on an average, the fish arrivals in the market amounted to 1.8q per day, thus totaling 654 quintal in a year. However, with the increase in the population, the demand of fish has increased many times and at time about 10 quintal fish is arriving in the market per day. However, in general the market demand is 6 to 8 quintals per day. In order to meet this shortage *Pangasius pangasius* has been imported very recently and this fish is supplied from Lucknow in ice packed condition, where it is being imported from Andhra Pradesh. Also *Clarias lazera* is still being received in the market. with the Govt. order on the ban of culture of *Clarias lazera* and *Hypophthalmichthys nobilis* and also because of acute shortage of fish in district Kheri Lakhimpur due to scanty rains, *Pangasius pangasius* has been imported to meet the shortage. Gradually people have started developing taste for this fish which is being sold @ Rupees 50 per kg. whereas other fishes like carps and catfishes (i.e. *Aorichthys* species and *Wallago attu*) are being sold at Rs 70 to 80 per Kg.

The most preferred fish for eating purpose are Tengan i.e. *Aorichthys aor* and *A. Seenghalal* followed by *Channa striatus* and *C. marulius*. People like fish with less of bone spines. Among carps *Labeo rohita* (size above 2 kg.) is the most preferred fish followed by bighead carp in marriages and other festive occasions where fried fish chips of big pieces of large sized rohu are served.

Fish availability in the market reaches its peak during November and December, when ponds start drying and fishes cultured there in are removed and sold in the market. also because of low water level in lakes and other normal waters fishing becomes intensive during November earlier and December ender.

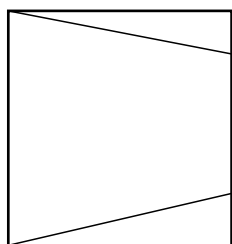
More over because of low water level in ponds and other water bodies, there is danger of poaching. However, minimum quantity of fish availability in the market was recorded during June and July, when because of the breeding season, fishing is prohibited during monsoon months and also because of high water level, it is not possible to catch fish from natural waters ponds are prepared and kept ready to receive fry of carps and other culturable species during July and August depending on the onset of monsoon and rain during above months.

The mode of fishing in ponds and natural lakes and price fixation of both cultured species and capture ones have been mentioned. However, at Lakhimpur a profit margin of 10 to 15 percent is kept from wholesalers to retailers and from retailers to vendor or from vendor to the customer. The owner of the pond or the producer sells fish from his pond to some selected fishing party. There is no intermediary in fish trade at Lakhimpur. The most common channels were channels I + IVV i.e. F-R-C+F-V-C, F-(WK+R)-C, and F-(WK+V)-C.

The major constraint in the progress of culture fisheries in the District of Kheri Lakhimpur is non-availability of good quality of the seed of both Indian and exotic carps. Therefore, it is important on our part to increase the production of seed of culturable species at Govt. fish farm and in the private sector or to purchase the seed from outside of the U.P. The water is retained in non-drainable ponds only for 5 to 6 month's, hence pond should be prepared well to culture the seed therein so that maximum fish production could be obtained in 5 to 6 month's rearing period.

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 - b) To cooperate with the Govt. of India and State Governments and with others Societies and institutions having similar aims and objects in working for the interests of wildlife.
 - c) To assist in enforcing and actively supporting the Forests Acts. Wild Birds and animals Protections Acts and Rules etc of State Governments and the Indian Arms Act and Rules in so far as they pertain to wildlife and to bring to the notice of the authorities any infringement of the same and to assist in the detention and prosecution of offenders in respect of such laws.
 - d) To advise and help the Govt. and wildlife administrators in the formation, maintenance and protection of Sanctuaries and National Parks, preservation of wildlife in general and endangered species of India in particular and in the introduction of exotic species into the country, rehabilitation of endangered species etc. and in the formulation and amendments of rules and acts, so to conserve and increase wildlife stocks.
 - e) To raise funds for carrying out the above aims and objects and to found and maintain museums reading rooms and libraries of natural history in order to disseminate knowledge regarding wildlife.
 - f) To carry out publicity and propaganda for the preservation of wildlife in India by means of monographs, journals, films, filmstrips and other feasible methods.
 - g) To assist members of the Society in obtaining facilities for viewing and photographing wildlife in India.
 - h) To conduct research into the problem of Wildlife management in India, and in pursuance of this, to initiate, encourage and, where possible assist in the projects of the study of threatened species and related objects and to provide reference and research facilities for such work.
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Activities



20-5-2018

Mr Anoop Nautiyal
delivered a very informative
talk on pollution and environmental
issues facing Dehradun



15-7-2018

Mr Kunal Satyarthi I.F.S.
delivered a talk on Biodiversity which
was well received by the members



